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NEWS IN BRIEF

Summations Due In Telex-IBM Suit

TULSA, Okla. – Final oral arguments in the $1.2 billion Telex antitrust suit against IBM will be heard this Monday (June 18) amid rumors that the judge in the case will hand down his decision at that time.

Lawyers for both sides have handed in their written arguments to Judge Sherman Christensen and have given him over a week to study those documents before the final arguments will be heard in court.

Several sources have indicated that Christensen has had enough time to study both the arguments and the evidence in the case so that he could make his decision when the court meets.

Power Cuts in New York Hit IBM Headquarters, Users

ARMONK, N.Y. – IBM headquarters here was caught with its power down in the wake of a recent heat wave.

"Con Ed couldn't supply enough power for the machines, the air conditioning and the lights," a spokesman said, and the giant reportedly had to close headquarters for a day.

Consolidated Edison had cut power as much as 8% in the New York City area. A spokesman for IBM's Data Processing Division said it received several complaints that computers were out of order after the power cut.

He said most of the complaints came from users in old buildings where power is normally about 1% to 2% below the regulation level.

Vote-Counting at Its Finest

CW West Coast Bureau

LOS ANGELES – A speed record for counting punched card ballots in the city election was reportedly set here when the first unofficial ballot total for the May 29 election was completed by 11:35 p.m.

The time was five minutes ahead of the previous record, according to City Clerk Rex Layton.

Walter G. Peterson Jr., elections supervisor, said the fast time was accomplished by extensive use of five helicopters and numerous automobiles to bring ballots in from outlying voting districts.

On the Inside This Week

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Says Suit Records Destroyed

IBM Blasts U.S. on Papers 'Violation'

By E. Drake Lundell, Jr.
Of the CW Staff

NEW YORK – It may be a case of the pot calling the kettle black, but IBM last week accused the government of destroying documents that IBM said it needs to defend itself against the government's antitrust claims.

Government attorneys countercharged that this move by IBM was solely intended to delay trial of the case.

In a motion filed in the Southern District Court here before Judge David Edelstein, IBM claimed the government had violated pretrial order number one which relates to preservation of documents and that government attorneys had violated special orders that refer to the prosecution's conduct of the case.

In the new IBM move, the firm asked the court to require the government to "account for its destruction of documents in violation of pretrial order number one" and to even account for documents that were destroyed before that court order went into effect "in violation of the government's duties and obligations."

Edelstein withheld a ruling on the IBM request.

Instead he asked the government to state whether any EDP documents were destroyed by the government after the pretrial order forbidding such a move was entered and to report back by June 22.

The IBM motion comes just months after Edelstein found IBM guilty of violating pretrial order number one for its conduct in "procuring" the destruction of the computerized index or data base of documents as part of the IBM/Control Data out-of-court settlement.

At that time, the Justice Department had claimed the data base destruction would seriously hamper its case against IBM.

The pretrial order in effect requires both parties to the case – the government and IBM – to keep all their records relating to data processsing in their possession.

All government agencies that use computers are required to keep all of the records on their applications and use of the system for possible use in IBM's defense of the case.

However, IBM claimed that several government employees involved in data processing have never heard of the order "or any special obligation to preserve the government's files relating to EDP."

At the same time, the IBM attorneys charged that "at the very first substantive deposition taken of the government this past week it was revealed that EDP files were 'purged' in September 1972, six months after the entry of this court's order."

In addition, IBM said its request for files from some government employees had produced the response that the files had been destroyed and therefore were unavailable.

Justice Department lawyers retorted

(Continued on Page 4)

Is DPMA Ready to Accept Invitation to Join Afips?

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – Computer users may get their first real representation in the American Federation of Information Processing Societies (Afips) if the Data Processing Management Association (DPMA) accepts an Afips offer of full membership.

The invitation to DPMA was tendered by Afips last week after the Afips board of directors "endorsed" the idea of DPMA as a full member and suggested the Afips Executive Committee meet with the DPMA Executive Council to ease the entry.

And while there may be some opposition to the idea within the ranks of DPMA, there is a better than even chance that DPMA will endorse the idea, according to outgoing international DPMA president Herbert B. Safford.

Major Problem?

The only major obstacle to full implementation of the plan might lie in whether DPMA should also become a member of the National Computer Conference Board and share in the revenues from the National Computer Conferences, some DPMA officials suggested last week.

At the same time, officials of both

(Continued on Page 2)

IBM Enhances Virtual Systems To Allow 3340, 3330 Intermixing

By Ronald A. Frank
Of the CW Staff

WHITE PLAINS, N.Y. – IBM has expanded the capabilities of its 3340 disk storage subsystems to allow users to intermix the newer storage with 3330-type disk subsystems. In addition, IBM added three other features to the 3340 to provide additional flexibility for 370 virtual users.

Previously supported only with DOS/VS systems, the 3340 will now operate under OS/VS software in intermixed configurations with 3330s. Both of the disk subsystems can be attached to either the 3830-2 storage control or the integrated storage controllers (ISC) and integrated file adapters available with some of the 370 systems.

The intermix capability will be provided through the operating systems at no extra cost but control storage extension will be required. On the 3830-2 the extension that allows intermix configurations will cost $470/mo on the IBM monthly rental (MAC) plan; $395/mo on the Extended Term Plan (ETP); and $432/mo under the Fixed Term Plan (FTP) which covers 12 to 23 months. Purchase price will be $18,800. The extension on the ISC of the 370/145 will cost $300/mo under MAC, or $14,400 purchase.

String Switch Feature

A string switch feature was also introduced which allows a 3340 subsystem to be dynmaically shared under program control between two direct access attachments of either the 3830 or integrated controller type. The string switch will cost $200/mo on MAC, $170 under ETP and $8,000 on purchase. An additional cost of $12/mo or $24/mo may also be required for a two-channel switch on the 3830-2, IBM said.

The 3340 enhancements in several configurations provide 370 users with two additional operating benefits. The string

(Continued on Page 4)

Sex by the Numbers

Special to Computerworld

STOCKHOLM, Sweden – A coding of "1" for male and "2" for female, proposed by the Japanese delegation to a standards conference here, was opposed by the British delegation on the grounds that for computers to "keep up with modern times" a third coding – presumably the character "3" – is needed for people who change their sex.

Other delegations, being mathematically oriented, then suggested that further character codes would be needed to describe bisexuals and those who fall under neither sex. No final decision was reached.

Safford Summons User Groups to Rally Against DP Fraud

By Marvin Smalheiser
CW West Coast Bureau

LOS ANGELES – The time has come for professional associations in the computer industry to speak out on computer-assisted fraud and promote efforts to prevent it.

Profile: DPMA and DP Fraud

Herbert B. Safford

That's the conviction of Herbert B. Safford, international president of the Data Processing Management Association (DPMA).

"We have to take a stand. It is our

(Continued on Page 2)

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Will DPMA Accept Bid to Join Afips?

(Continued from Page 1)

groups said last week they were sure many of the problems could be worked out between the two groups – which may mean that next week's DPMA conference in Chicago will be the last exposition put on by that group.

George Glaser, the new president of Afips, stressed he was "very much in favor" of the move to invite the DPMA into Afips and he would devote "substantial time and effort" during the next year to see that its membership is realized.

"It is very clear that (many of the Afips projects) would be useful to DPMA members and that they could add substantially to Afips efforts," he added.

In addition, he noted that 'Afips needs DPMA to make its membership" include all elements of the computer community under its banner.

To date, there is no strong user voice in Afips activities, several sources have noted, with the bulk of its support coming from the Association for Computing Machinery which primarily represents programmer interests and the IEEE which is made up largely of engineers and computer designers, plus a sprinkling of special interest groups that use computer equipment.

DPMA, with almost 30,000 members, is made up largely of managers or management-level people in computer-using organizations – largely in the business area with a smattering in government and other areas.

Therefore, these sources said, its membership in Afips would provide broad-based user interests that have heretofore been somewhat lacking.

On the other side, Safford said that while the group had not yet had time to discuss the proposal, it would give it "very serious consideration."

About six years ago, he noted, Afips had offered an associate membership to DPMA, which was rejected at that time and the idea has been a "dead issue" ever since then.

The new offer was the "most encouraging" since then from Afips, Safford felt, and rated the chances of DPMA acceptance as better than even odds, although he said there would be a more accurate prediction on how the membership views the possible linkup after the international conference next week.

Jim Sutton, the only announced candidate for the DPMA presidency, said the offer was "enticing" and noted that joining Afips is the "route we will eventually go."

However, he brought up the problems of the conferences that are run by both organizations and noted the conflict, with exhibitors not wanting to be in each show since they occur at similar times.

He said the major issue now would concern conference scheduling and the percentage of revenue that DPMA could get from the National Computer Conferences if it was willing to give up its yearly show for the one big show a year.

But at the same time Sutton said he was enthusiastic about what joining Afips could do for the industry and computer users.

Groups Urged to Fight DP Fraud

(Continued from Page 1)

obligation. If we don't, no one else will and the public will suffer," Safford said in a recent interview.

Some way should be found to develop an enforceable code of ethics to deter fraud through use of computers, he added.

"And it should be made very clear that even without a code of ethics any member found responsible for fraud should be censured by associations and throughout the industry.

"I think we can take a lot stronger stand than we are at the present time."

Safford favors licensing for data processing personnel "but it has to be well thought out and well-organized."

Safford, who said he was ashamed of the DPMA code of ethics because it doesn't have any teeth in it, thinks enforcement is essential for any code of ethics.

"It has to be enforceable either through censure by an association or by legal prosecution," he said, adding he thinks the enforcement will have to be by government agencies.

In urging a strong stand against fraud by computer, Safford said rules should be set up:

- To protect individual computer proprietary programs.
- To safeguard computer programs.
- To assure lockout access to computer programs by unauthorized personnel.

Computer user associations, he said, can aid EDP auditors by advising them how to protect computer system design, computer programs, program security and installation security, all aimed toward preventing fraudulent DP use.

Safford sees a great need for associations to enhance the image of their membership in the community, industry and government.

"I don't think we have done a good job in trying to raise our professional image. We are just sitting back and talking to ourselves. We don't talk to the community."

To strengthen ties with user companies, he suggested guidelines that would enable the companies to better assess performance standards of computer personnel and for contract performance.

Similarly, he urged that associations develop guidelines for top management review of data processing installations.

They can advise management of what to look for in installations, what returns on investment to look for and on how to establish priority for applications, he said.

Is Interface Standard in Sight?

Special to Computerworld

HUDSON, Mass. – The chances of users being able to extend use of plug-to-plug peripherals and used computer systems have become much brighter, according to the June *Newsletter of the Society of Certified Data Processors.*

The improved position is the result of the defeat of the U.S. Ansi X3 Committee by England, Germany, Japan and Sweden, and the adoption by the International Standards Organization (ISO) of a modified Japanese proposal for worldwide standardizing of channel interfaces. The functional requirements of the Japanese proposal are now complete; electrical and engineering characteristics are being added.

Technically, the Japanese proposal is closely related to the channel interfaces of the IBM System 360. With modifications adopted during a recent ISO conference, it is believed to satisfy a 28-point requirements statement that was drafted by the U.S. delegation before the 1971 decision to stop U.S. work on the interface project.

The major impact of this proposal is expected to be in the used-computer market and in the plug-to-plug independent peripheral area.

U.S. Scramble Starts

Meanwhile, the Ansi X3 Committee, which is the official U.S. representative to ISO and had little to do with the Japanese project because of its opposition to the international standard, now must scramble to catch up with events. The committee is now reviewing the Japanese document in order to offer any comments or changes it may feel necessary.

However, the preparation of the American position will probably be delayed since no technical work in this area has been performed in the Ansi X3 Committee since 1971.

In addition, the date for the submission of comments on the international standard is Oct. 31, and as the X3 Committee does not meet until then it may well be too late for any effective representation of the views of the U.S. to take place.

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Support Seen Necessary To Establish DP Controls

Plight of Non-Identity Found Crucial to Role

Auditors Get Word—Gain Management's Confidence

By Marvin Smalheiser
CW West Coast Bureau

SANTA MONICA, Calif. – If the EDP auditor is going to kayo computer-assisted fraud, then he is going to have to work a little more on his clout.

That was the recurring theme here recently at the first national EDP Auditors' Conference as more than 225 auditors wrestled with the auditor's image and the threat of computer fraud.

The need for standards for EDP auditors was another basic theme at the conference which was sponsored by the fledgling EDP Auditors Association, organized last fall.

The two-day conference featured speakers from across the country who emphasized that auditors must win the support of management to secure the "clout" to establish data processing controls.

Auditors, the speakers stressed, have a major difficulty in establishing their identity and finding how to influence management to set up these controls.

Russ Quinn, a general auditor with Rockwell International, El Segundo, Calif., expanded on the auditor's plight of non-identity.

"We're not sure what it takes to qualify as an EDP auditor," the keynote speaker emphasized. "We're not sure how we should apply our EDP audit resources; whether we should concentrate on systems controls, operations management, selection of equipment, project management or all of these."

But at the same time, he made clear it is the responsibility of the EDP auditor to "assure management it is obtaining a maximum return on its investment in EDP" and to give management visibility into its investment.

William H. Murray of IBM urged the auditors to independently assess the risk of fraud.

Murray, senior program administrator for data security at IBM's Data Processing Division, said the auditor must be customer-oriented and recommendation-oriented.

The goal should be to recommend action or provide visibility of the level of risk, he said.

The problem of standards was detailed by Robert Beals of Arthur Andersen & Co.

He said standards must be established for design and installation of systems, for training of auditors and to gain acceptance of management.

Beals was critical of the lack of software security built into hardware by manufacturers and the lack of audit software packages from manufacturers.

He criticized the failure of manufacturers to include controls in software.

T.B. Barron, senior EDP auditor for Great Western Financial Corp., called for basic standards for auditing and guidelines for staffing.

He warned the auditors against getting "too technically involved."

"If a guy is going to get to you he is going to get to you," he said, and counseled the auditors to do what is reasonable without making controls needlessly complicated.

Continuing the conference's central theme, Joseph J. Wasserman, who heads a computer audit software firm, called EDP auditors "the world's worst salesmen" and told them they will have to sell their function to management.

Unless they can sell themselves to management and get resources to work with, then auditors will continue to be severely inhibited in their efforts to monitor computer operations, he said.

Daniel Cashier of Coopers & Lybrand, Los Angeles, urged auditors to take a management-oriented approach relating their efforts to business objectives.

In EDP audits, he went on, the auditors should be assigned three important roles: performance of traditional audits, performance of operational audits and educational assistance to management.

"It is imperative," he said, "that systems be designed to include effective internal controls and to achieve optimum utilization of EDP resources and data."

Games Only First Attraction

PHILADELPHIA, Pa. – Computer games such as space war, blackjack and checkers help attract some students to the computer terminals at the Univeristy of Pennsylvania's Wharton School, but they soon find more rewarding pastimes there, according to Mark Gelberg, director of computational services.

Programs have been written to accompany such courses in Wharton's curriculum as econometrics and operations management.

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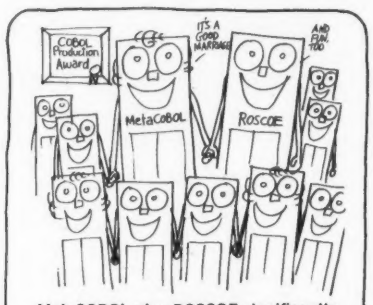

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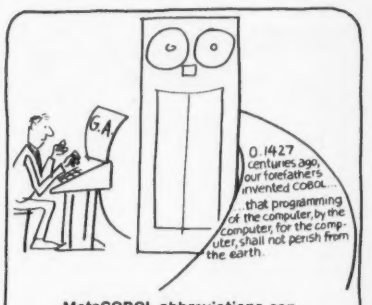
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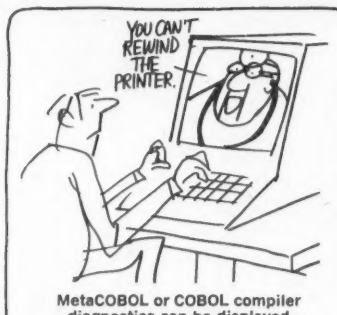

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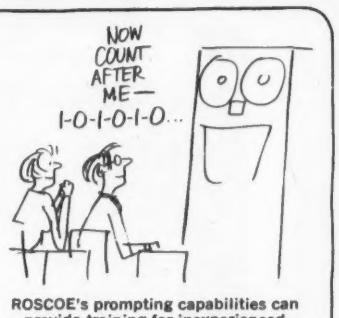

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Voting Lists Challenged in Court

By Patrick Ward
Of the CW Staff

NEW YORK — This city's most recent election using computer-prepared voting lists is under challenge in the State Supreme Court.

A voting rights group here has charged that use of "hastily prepared" printout lists in a recent school board election denied some citizens their right to vote.

State law requires use of buff-colored permanent registration cards for all elections. The buff cards carry the voters' signatures.

In the case of the school board election, though, the Board of Elections wanted to use computer printouts for voter listing because the buff cards would be needed again by the June 4 primary. Because of the time limit, the legislature decided to allow use of the printouts.

The Committee for Democratic Election Laws objected to the move, however. Their attorneys argued that state law specifically requires the buff cards so that voters' signatures can be checked at the polls.

The committee also had technical objections to using the printouts. "We felt there would be a lot of errors in that there were 3-1/2 million voters involved," said Judy Baumann, the committee's national secretary and a former computer programmer herself. "We don't have any objection to computer lists, per se," she said, but the committee thought the "lead-up process would not be sufficient."

After the election, Baumann said, "We had complaints from all over the city. We had people who had been registered voters for years who were turned away at the polls." People had been warned to bring identification to the polls, she added, but many long-time voters had not done so.

Neither the voting rights committee nor the Board of Elections could give a figure on the number of persons turned away at the polls.

IBM Hits Justice 'Violation'

(Continued from Page 1)

that IBM had taken some statements out of context in making the charges and had grossly misrepresented other government statements.

Furthermore, the Justice lawyers charged that the IBM position if accepted would allow IBM to go on a massive fishing expedition through government files that might take years.

In addition, the department lawyers noted they had complied fully with the IBM document requests and stated the new IBM motion should be denied with prejudice.

"For the second time in this lawsuit, defendant has devoted a mass of papers, with the usual errors of fact, unsupported assertions and self-serving statements, albeit sworn to, to the myth that the government came under some all-inclusive obligation to preserve documents" prior to a court order to that effect, the government attorneys said.

"However, by the very act of making these claims, submitting these affidavits and asking for an audience with the court on the subject, IBM's counsel have again served IBM's purpose to delay preparation and consideration of this case on the merits," the government said.

IBM said the government has "special obligations" to preserve documents which may be relevant to the defense of an action or which the other side of the case has asked for.

In addition, IBM said the government as prosecutor in this case had a special responsibility not to destroy or withhold information that might be useful to the defense, citing the recent Daniel Ellsberg case as one of the precedents for this claim.

IBM Enhances VS To Allow Disk Mix

(Continued from Page 1)

switch capability allow users to dynamically switch a disk subsystem between two control units so that two mainframes could share the same data base.

The intermix feature will be important to users who already have a 3330 capability but want to add 3340 disks. For installations with a diverse job mix, the 3340 data modules with a capacity of 35M or 70M byte/spindle offer a more flexible operating environment than the 100M byte/spindle capacity of the 3330.

In addition, the 3340 has a data transfer rate of 885 kbyte/sec compared with the 806 kbyte/sec rate of the 3330. For users with a long-term contractual commitment to the 3330, it will mean the 3340 technology can be added without abandoning the earlier disk subsystem.

An expansion feature doubles the maximum number of drives that can be attached to a controller to 32 drive/3830 or ISC on the 145. With the 158 and 168, up to eight strings or 64 drives of 3340s can be attached.

A remote switch attachment will allow the configuration of a string switch on the control panels of the multiprocessor 158 and 168 systems.

To support these hardware features, IBM said OS/VS1 and OS/VS2 will be extended to support the 3340 disks. OS/VS1 will be available with first 3340 deliveries on the 370/135 through 168 in March 1974. OS/VS2, Release 2 will be available for models 145 to 168 on the same date.

First deliveries of the hardware features are scheduled for June 1974. The 3340 will not be supported on 360 mainframes nor will it be supported on systems which use non-virtual operating systems.

Management Text Geared to Major User

BOSTON — A new book expounding on the decisions executives must make in dealing with DP people has been published by Allyn & Bacon here.

Written by two *Computerworld* staff members, *Computer Use: An Executive's Guide* is a management text for major users of DP services, or "corporate officers who must have the insight to evaluate present and proposed DP departments," according to one of the book's reviewers.

John Alexander, a division manager of the American Management Association, noted the book would also be helpful to corporate executives "not involved in DP directly," but involved in DP decisions.

Written by Edward J. Bride and E. Drake Lundell Jr. after more than two years of researching CW files and personal notes, the book covers various problem areas, including system (and software) selection, contracting, security, financing and personnel. Several appendices of DP applications and sample contracts are also included.

The book is available for $13.95 from Allyn & Bacon at 470 Atlantic Ave.

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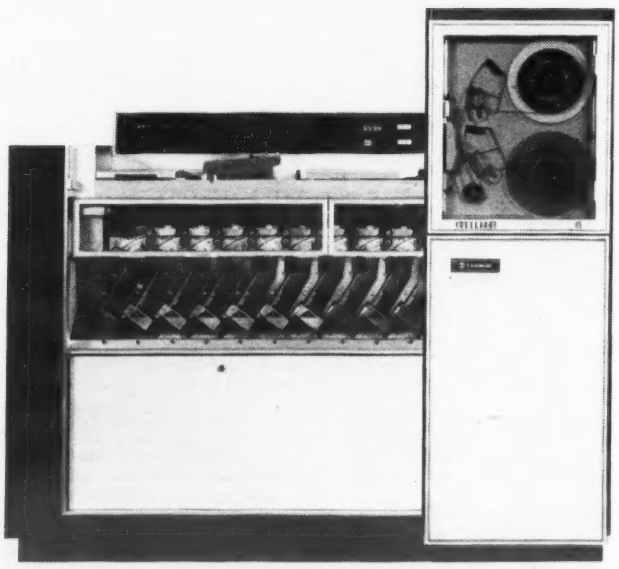

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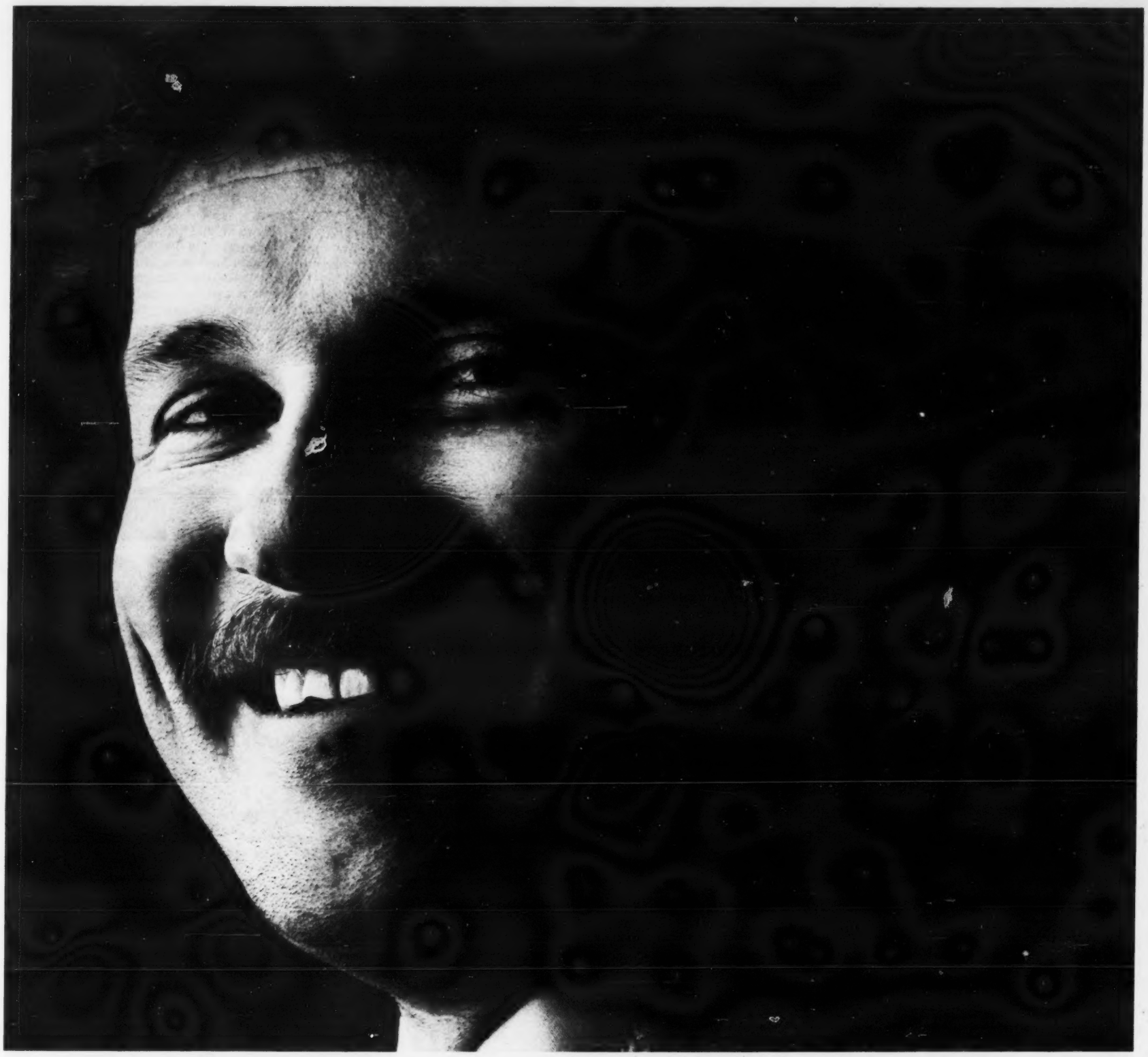

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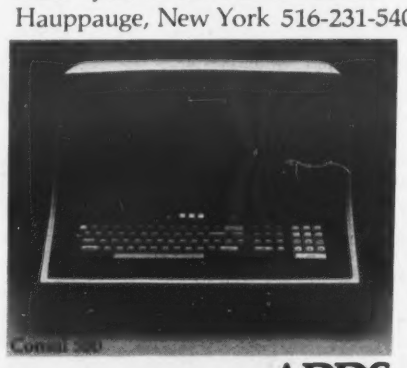

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Antitrust Laws, an Historical Perspective — Part I

Hatred of Monopolies an 'American Political Habit'

By E. Drake Lundell Jr.
Of the CW Staff

Antimonopoly feelings are woven into the very fabric of American life and law with a few threads from English common law and some from particular American experiences.

"Hatred of monopoly is one of the oldest American political habits and like most profound traditions, is consisted of an essentially permanent idea expressed at different times," according to an article by William L. Letwin on "Congress and the Sherman Antitrust Law 1887-1890" in the University of Chicago *Law Review* of 1956.

Since IBM is being sued by the U.S. Government on antitrust grounds, a look at the history of antimonopoly legislation can help the computer community understand the arguments of the case.

Therefore, *Computerworld* is presenting this series on the history of the antitrust laws and an outline of some of the major antitrust cases that have been tried, plus an analysis of how these past cases relate to the present action against IBM.

" 'Monopoly' as the word was used in America, meant at first a special legal privilege granted by the state; later it came more often to mean exclusive control that a few persons achieved by their own efforts; but it always meant some sort of unjustified power, especially one that raised obstacles to equality of opportunity," Letwin noted.

Historical Background

The early American colonists brought the idea that the government should not set up any monopolies with them from England, where in 1624 a statute on monopolies had severely limited the right of the king to grant exclusive privileges, and that statute is reflected in some of the earliest laws of this country.

For example, the colonial Massachusetts Legislature passed a law that "there shall be no monopolies granted or allowed among us," and several other states passed similar measures, even though none were as specific, in the time preceding the Revolution.

An antimonopoly provision was almost embodied in the U.S. Constitution itself at the urging of Thomas Jefferson. Several states, most notably New York, Massachusetts, Rhode Island and New Hampshire, advocated placing a prohibition of monopolies in the Bill of Rights.

But even though no mention of the monopoly question was contained in the final version of the Constitution, "No one argued that the prohibition was omitted because the public favored or was even indifferent to monopolies," according to Letwin.

The antimonopoly feelings later played a large part in defeating the Second Bank of the U.S., which had been condemned as a "monster monopoly" by no less a foe of the bank plan than President Andrew Johnson.

Antimonopoly feeling reached its peak after the Civil War as the country entered the Industrial Age and as larger corporations came to dominate the economic life of the country.

At about the same time, a fear of plutocracy was born, particulary in the sections of the nation still devoted to agriculture.

Fear of Wealth Prevailed

This fear of the rich captains of industry, the plutocrats who achieved their power and influence by wealth, replaced the earlier American fear of oligarchy, or government by the few.

The fear was based not so much on the worry that the new plutocrats would actually overthrow the American system of republican democracy, but rather a fear that with their great concentrations of wealth they would be able to subvert representative government and make it do their bidding.

Led by the grangers and the other patrons of agriculture, the small farmers began to lead the fight against monopolies, particularly the railroads, which they depended on to move their goods.

At the Illinois Farmers Convention of 1873, according to Letwin, the first resolution passed by this group declared all "monopolies, not regulated and controlled by law, have proved detrimental to the public prosperity, corrupt in their management, and dangerous to republican institutions."

The second resolution struck at the railroads, which were seen by the farmers as the prime example of a monopoly. It declared "the railways of the world, except in those countries where they have been held under the strict regulation and supervision of the government, have proved themselves arbitrary, extortionate and as opposed to free institutions and free commerce between states as were the feudal barons of the Middle Ages."

> *"'Monopoly' . . . always meant some sort of unjustified power, especially one that raised obstacles to equality of opportunity."*

Trusts Appear

Antimonopoly feeling became even more concentrated in the 1880s, when "trusts" or combination of firms in one industry began to appear.

Under the trust device, one firm would gain control of all others or most others in an industry and would divide the market between these firms, usually on a geographical basis.

Certainly the most famous of these was the Standard Oil trust, but trusts sprang up in almost all areas of American business life, including the paper bag trust, the envelope trust, the salt trust, the paving-pitch trust, the school slate trust, the sugar trust and even the whiskey trust.

As trust building took hold of business life in the late 1880s, the public clamor against them grew, with people claiming they subverted the government through bribery and victimized the consumer by driving out competition and raising prices.

But while there was a great deal of criticism against the trusts, few people could offer solutions for dealing with them and limiting their power. This was left to the politicians who soon got into the act.

Next week: The Sherman Antitrust Act becomes the monopoly law of the land.

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Management Must Pick Goals, Panel Says

Good Training Program Fills Company, Trainee Needs

By Michael Weinstein
Of the CW Staff

NEW YORK – A good training program takes into account both the needs of the company and the desires of the trainees, according to an NCC session on in-house training – "Methods, Media and Interaction."

But lest anyone mistake the horse for the cart, said Dr. John Connelly, vice-president of manpower planning at Chase Manhattan Bank, "training is a management function.

"It is management who must decide what objectives the training program must fill. These objectives must then be translated in such a way as to benefit both the trainees and the company."

As an illustration of a training program with sound technical goals but questionable benefits for the trainees, Dr. John Hughes, an industrial psychologist at IBM, pointed to some computer schools which, "while they may teach students the mechanics of programming, many times can't find jobs for their graduates.

"In a case like this, while the training program met the goals of the company, it was far short of benefit to the students," he noted.

To bring these two objectives into line, Connelly advised users to analyze the population using the training. "It is important to show these people where their final work product fits into the entire system.

"As a regular practice at Chase, programmers frequently visit other departments. This is to show them how their work is helping others perform their function and make them aware of the problems in other areas," he said.

One way of determining if the training is working, is to develop feed-back procedures such as pretesting and posttesting.

Users should become familar with various media available for training and when such media can be used most effectively, according to Rudy Gartzman, consultant for Intergroup Production.

He stressed that the object of choosing a media was to optimize the time taken to train against the result obtained.

Film is the most vivid media, Gartzman said, as it has color, motion and sound.

The most effective training is that which allows the student to participate, Hughes said.

Another suggestion was to look within the company and find people who were sought out often for answers and opinions and make them instructors.

These people are not always the management personnel, Connelly said, but they are credible and understand the people they are teaching.

Many training systems are designed to get people to accept new methods – not just to teach new techniques – Connelly added.

This means users must consider all objectives honestly before deciding on a training plan. For example, if the object is to get the accounting department to accept on-line entry, then the training should involve showing the department how on-line entry works and where it fits into the operation. It is not necessary for them to learn programming.

Theory, Technology 'Can't Get Together' In Social Sciences

NEW YORK – "Social sciences today are facing the same problem which plagued early business simulation, namely the inability of technologists and theorists to get together," stated William O'Leksy, research fellow at the Industrial College of the Armed Forces, at an NCC session on international relations simulation.

Simulation in the social sciences is not, as yet, widespread. This is due in part to the fact that it is much harder to generate a model around a specific problem, than to adapt a model for general use and plug a problem into it, according to Richard Van Atta, assistant professor at the School of International Services of the American University.

This "laziness" is holding social science simulation back, said George L. Draper, Joint Chiefs of Staff, U.S. Air Force. "Models have to be developed to meet a specific goal," he said. "Unless input is oriented to the user and his problem, the model loses credibility."

The question of credibility, or validity, is a major problem in the opinion of Jeffrey Milstein, professor of political science at Yale. This, he said, is one reason computers have not been integrated into policymaking activities to any large extent.

"The results of a simulation model are valid if considered as a source of alternatives," stated Milstein, "but they cannot be taken as the undisputed correct answers."

Draper attributed the lack of computer use by policymakers' to politics. "A policymaker wants support for his preferred position, not an objective appraisal of the situation. In other words, he wants to know how to get from A to B, but not whether he should actually be going from A to B."

The panelists agreed that computers were not essential to international relations simulation in many cases, that the work could be done manually if somewhat more slowly. "However," O'Leksy said, "using the computer guarantees the results match the input parameters. A computer won't alter parameters while going through calculations, whereas humans tend to do so unwittingly, largely because of idealogical biases."

The main focus of social sciences now, in Draper's opinion, should be an effort to pool existing software technology.

Error Riles Solons

PITTSBURGH, Pa. – A "computer error" concerning a new mass transit system has caused a furor among local politicians here. The Urban Mass Transit Administration has accepted blame for the "error" which showed costs of the Port Authority Skybus program as being $356 million, $128 million higher than had been predicted.

But the human error was the result of doubling the final Phase C cost of the Early Action Program which combines Skybus construction with two bus-only express lanes and trolley car rehabilitation, an administration spokesman said.

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Executives Wonder...How to Get More From Employees

By Michael Weinstein
Of the CW Staff

NEW YORK – Many line personnel in data processing departments don't understand what they are supposed to accomplish in their jobs, Tad Kenney, manager of Executive Resources, told an NCC session on "Career Development."

"Managers often fail to meet with the programmers and operations personnel to define their jobs and responsibilities," he said.

J. Webber, assistant to the president, The Berton Group, found that "people are generally more interested in the hardware than the people."

Worker Power

"If you visit the floor of the NCC, you see exhibits on how to get more hardware, where to get more software, but no exhibits on how to get more from your employees," he added.

How do you involve personnel in the objectives of the company? Webber asked.

"Build a strong in-house staff, attack and use each talent by prior definition of objectives, and reward on attainment of these objectives," answered Dave Labelle, assistant vice-president of Manufacturers Hanover Trust.

"But not all rewards must be in terms of advancement into management positions," Labelle noted. "Many a good systems analyst has made a poor manager only because he did too good a job and management felt he had to be promoted.

"In our firm, we have built three different career paths – staff, technical and managerial – and at various times during their careers each Manufacturers Hanover employee can direct himself toward whatever goal he feels best for him," he said.

How does the firm determine when a given person has attained a goal for which he should be rewarded? "By testing," according to Gordon Gilchrest, vice-president of Insco System Corp.

Tests are a valuable aid to gauge what each level should know and allow each person to show he has attained the prerequisite knowledge for a certain level, he said.

While other panelists and members from the floor argued against testing, Gilchrest said he could not see a better option.

Testing can also be used to show areas of weakness. This was said to be successful at Western Electric where the tests were used to show how each person could improve rather than set up a ranking system.

For testing of this sort to be successful, Webber said, each person must be convinced that testing will not lead to punitive action.

Punitive does not always mean a direct action, Webber added. "Take, for example, the term 'maintenance group' or 'tape hanger.' Training should exist that allows people to move above a preset plateau," he said.

Less Philosophy

A suggestion for the small user who wants to start a training program but does not know what questions to ask initially was supplied by Gail Buerger, director of DP training at Peat, Marwick, Mitchell & Co.

She suggested users invite representatives from various DP training companies to submit proposals. The advantages of this approach are:

- It forces the user to define his objectives.
- It gives him a basis for evaluating cost if he were to obtain this service from an outside source.
- Most importantly, it shows him the methodology used by these firms to meet training objectives.

The user should realize, she added, that he is under no compulsion to accept any other proposals. The user should further differentiate between training problems and personnel problems. Many problems that first appear to require training solutions could in actuality be solved by better personnel managers.

Damage Responses Predicted

COLUMBIA, Mo. – University of Missouri engineers will use a digital computer to control dynamically an analog computer model they are building to predict how the Navy's Sanguine system for communicating with nuclear submarines will respond to damage.

By studying the model's response to simulated casualties and damage, the researchers aim to predict the behavior of the real Sanguine system in case of attack or equipment failure.

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Who Cares About Security?

NEW YORK – After listening all day to computer industry officials claim users are not interested in data security, two users said "not so."

There were seven hours' worth of data security discussions at the NCC, with an interim report on IBM's five-year, $40 million study as a focal point.

Toward the end of the day, Peter Browne, an official of State Farm Mutual Automobile Insurance Co., said there was only an "element of truth" in the claims that users were not concerned about data security.

He was reacting to a suggestion that IBM's study was started only as a result of a "gut feeling" by T. Vincent Learson.

Richard Mills of First National City Bank chided session chairman C.L. Foster of IBM, suggesting, "Why don't we call a meeting of all computer users not interested in data security, and see how many show up?"

Foster claimed users would only accept security if it were offered without additional charge.

ACM Chiefs Challenged on Bylaw Change

By Michael Weinstein
Of the CW Staff

NEW YORK – "I won't guarantee perfection, but we will get pretty close to Ivory soap," according to Joseph Cunningham, executive director of the Association for Computing Machinery, at the Members Officer Forum.

But if all is happiness at ACM from the executive views, comments from the rank and file represent a divergent outlook.

Issues used to challenge the executive members ranged from the cry of poor financial operation; publications that were alleged to be too esoteric and academic; the dropping of local support programs; and the issue of the executive changing the bylaws as a means to control the local chapters.

The underlying complaint seemed to be that the ACM officers do not care enough about the problems of the great mass of applications- and business-oriented computer professionals.

Officers stated it was too hard to produce consumer-type publications since the association had to solicit articles.

The rationale continued that these articles were always coming from the universities as companies did not like their employees to present articles for publication.

Anthony Ralston, ACM president, added there was not enough money to hire a large staff to put together such a publication.

One member asked for more activity within the areas of support for seminars in order to raise the professional level of the industry.

But probably the most emotional issue raised was the allegation that the officers of the association had changed bylaws without the advice or consent of the lay membership at a previous meeting held in Anaheim, Calif.

The substance of this change dealt with raising matters of importance.

Previously, any 10 members of ACM who felt some issue was important could petition for a general referendum.

The bylaw change stated that 5% (about 1,000 members) of the association had to petition for this general referendum.

The charge from some of the lay members is that the officers made this change to develop a tool to make the local chapters "tow the line."

The allegation is that the officers could use this situation to tell local chapters that if they do not follow the direction of the national body their charter will be taken away.

Jean Sammet, ACM vice-president denied this allegation, asserting that the real reason for raising the number of members was solely financial.

Polling ACM's members as required by raised issues cost the association about $5,000. ACM was only trying to make sure issues raised were truly important and not just the view of some splinter group, she said.

This explanation did not convince a member from a Texas chapter who stated that previously Ms. Sammet had told members the change in the bylaws had been raised for discussion at the previous Anaheim meeting in connection with a chapter that was violating the official policy of ACM.

Ralston said the officials had changed the bylaws and not the constitution and therefore it was unnecessary to notify members.

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Editorial

Doers and Thinkers

Problem definition has long been criticized as a short step, although one in the right direction.

Sen. Philip Hart (D-Mich.) has taken an additional step: after defining what he considered a problem (monopolies), he proposed specific legislation to deal with that problem.

And while he gives the bill little chance of passage, he said his hope was to create new thinking on the bigness of U.S. corporations.

Users and the computer industry should follow Hart's example. For the past six months, lawyers, judges (the Supreme Court), congressmen and industry figures have called for new legislation to protect computer software.

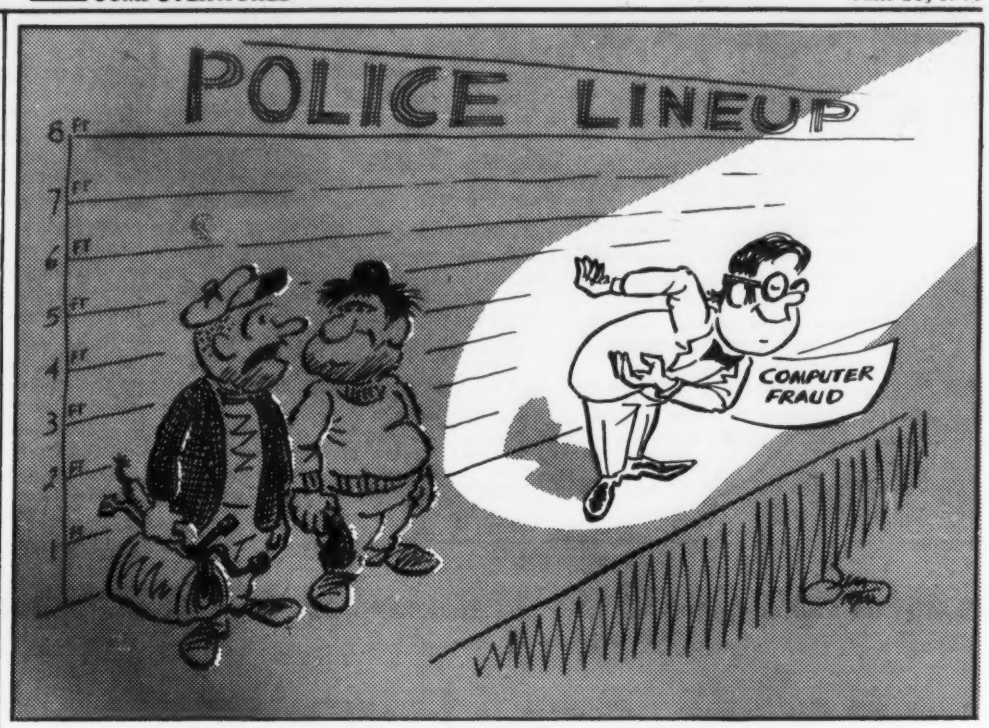
The latest cries for help were heard at the National Computer Conference, where lawyers admitted they were not creative or innovative, but should be compared to "scribes."

It's about time people stopped calling for new software legislation and started proposing it.

While investigating legislation can be costly, groups of interested parties can help.

A financial grant to the new Computer Lawyers Group, possibly from the Computer Industry Association or from the software division of the Association of Data Processing Service Organizations, would be a great step in the right direction.

The lawyers group could then conduct studies among users, software designers, patent holders and other interested parties, so that the proposed legislation could be introduced seriously, rather than with the purpose of merely generating new thinking.



'Let's Face It, Basher, We're Old Hat!'

Errors Uncovered in ANS Cobol, Version 4

By Kenneth P. Seidel
Special to Computerworld

In the course of work using TSO on System 370/165 in an ASP environment, I have detected a number of rather astonishing errors in IBM's ANS Cobol, Version 4. I think users should know about these instances of sloppy workmanship by IBM, especially since they are now paying for this software, a Program Product.

- Consider the two elementary packed decimal items A and B, described as:

02 A COMP-3 PIC S9V99, VALUE 1.04.
02 B COMP-3 PIC SV99.

The statement MOVE A TO B should yield the result .04 in B. However, the observed result is 1.04 and erroneous computational results are obtained when subsequent statements expect B to contain only a fraction. IBM has ignored the receiving item's picture; the result is not Cobol.

- Gone are the automatically generated slack bytes produced by Cobol F in order to assure proper alignment for binary items.

Unless the SYNC(hronized) clause is declared for every binary item, storage reservation is now simply on a byte-by-byte basis.

At first glance, this appears reasonable, at least when OBJECT-COMPUTER IBM-370 is specified, for the 370 hardware does not require that words and halfwords begin at addresses which are multiples of 4 and 2, respectively. The trouble is, without SYNC, the compiler now produces code to first move the field to a temporary storage area, properly aligned, from which it is then accessed by an appropriate load instruction.

The compiler always assumes this worst-case handling to be needed, regardless of whether

Viewpoint

the item is allocated in working-storage on a proper word or halfword boundary.

The result is a totally unnecessary (and slow) SS move instruction where none is required on a 370 – for every single reference to a binary item!

- The *flow* and *state* compiler options produce additional object code to keep track of program flow, so that a flow-trace and last-statement-executed diagnostic summary may be produced when program execution terminates abnormally.

To receive this summary printout, we must allocate the SYSDBOUT file to the terminal. It also appears to "require" allocation of ddname SYSDTERM, but no additional output results therefrom. Fittingly, no known documentation of this "feature" exists.

- The interactive Cobol test-package TESTCOB (a TSO program product) provides the ability to perform program checkout under control of the programmer, using subcommands supplied through terminal entry. Reference to program statements is made by use of a compound number containing card number and verb number, e.g. the subcommand "at 654.1" establishes a breakpoint just prior to executing the first verb on source card number 654.

At this breakpoint, execution is suspended, and the programmer may enter other subcommands. One such subcommand enables the user to list parts of the program, e.g. "source 650:669" requests printout of the 20 source program cards numbered 650 through 669. However, the dataset from which this information is retrieved is the Compilation Listing (!).

Obviously, a better design approach would be to refer to the source dataset, maintained by Edit, which is the input to the compilation process.

Furthermore, the listing has non-numbered records throughout it, such as page headers, which make it impossible to list, in one subcommand, any range of source cards containing such a break.

In protesting the use of the listing dataset, we point out that its records are 120 bytes long, compared to the 80-byte records maintained by Edit for use as compiler source. Proper design of TESTCOB would discourage production of a compilation listing, and result in substantial economies in the use of disk space available to TSO.

- Debug packets do not work as described in the manual GC28-6396-3, wherein (page 330) it is stated that the word DEBUG may appear anywhere within columns 1 to 72 for the "packet header." Under TSO, the source program numbered dataset uses card image columns 1 to 6 to hold the line number. It turns out that DEBUG is recognized if it begins in column 1 or 2 – a clear conflict with the line number area.

- The Version 4 rule for comparison of two non-numeric data items of unequal length differs from the rule in Cobol F. The difference is a subtle one, and no mention of its effect can be found in IBM Cobol differences manuals. The Version 4 implementation is obviously keyed to the use of the 370 instruction CLCL (Compare Characters – Long), where a padding character is specified in a general register.

If the two operands are equal after byte-by-byte comparison exhausts the shorter item, comparison continues on the basis of extension of the shorter item by the padding character, which is SPACE in the case of Cobol. A sample serves to illustrate this difference:

77 A PIC X(260) VALUE LOW-VALUES.
77 B PIC X(250) VALUE LOW-VALUES.
IF A LESS THAN B GO TO ITS-A-370 ELSE GO TO ITS-A-360.

In Cobol F, if the extra bytes of the longer item are all SPACES, after equality of the earlier bytes has been established, then the two items are equal, otherwise the longer item is greater. On the other hand, after equality of bytes has been established up to the point where one item is exhausted, Version 4 can still lead to a result A > B, A = B or A < B.

Seidel is DP consultant and head of Seidel Computer Associates, Fallbrook, Calif.

Letters to the Editor

Let Each Language Do What It's Designed For

If we have learned anything from Algol and PL/1 by now, surely the lesson is that there is no such thing as a "universal programming language" or even anything which reasonably approaches such a title. It is an elementary premise of programming language design that each language should have a purpose (and apparently in the minds of some, that each purpose should have a language).

Why then can we not be contented to let RPG do the things for which RPG was designed, let Cobol do the things for which Cobol was designed and let those who have a preference with respect to the gray area in between enjoy that preference without trying to ram it down someone else's throat?

I had very little patience with "Fortran idiots" when that was the fashionable thing to be and I think I will have less patience with "RPG idiots," "Cobol idiots," "PL/I idiots," or anyone else who seems more interested in demonstrating his magnificent wisdom to the world than he does in pursuing the work of a mature data processor, i.e. turning out useful and reliable results by making the best use of whatever tools are at hand.

Joel A. Neely
Director of Computer Sciences
Freed-Hardeman College
Henderson, Tenn.

Church as Stockholder

In response to T.C. Eickmeyer's letter [CW, May 30]:

The Episcopal Church is an IBM stockholder, and has the same rights and responsibilities as all other stockholders. Eickmeyer asked if IBM tells the Episcopal Church what to do. If IBM were Episcopalian it could and would affect the operations of the Church.

J.H. Muller
Mgr., Systems and Procedures
Columbia University in the
City of New York
New York

Church as Part of Life

Re T.C. Eickmeyer's letter:

Any church establishment is only as valid as its concern for, and relationship to, humanity. If that concern takes it into fields not specifically "religious," the Church has not erred, the definition of "religious" is faulty.

Eickmeyer has fallen prey to the philosophy that dicotomizes the Church from life, relegating to the Church its ritual and an hour a week. Unfortunately, ethical problems are not so easily walled off.

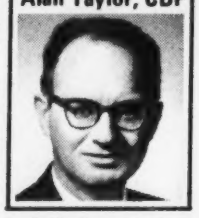
As an Episcopalian I applaud any church's involvement in the day-to-day activities and problems of the world.

G. L. Horle
Denver, Colo.

User Support Needed

NBS Report on Interface Standard Misrepresented

The Taylor Report
By
Alan Taylor, CDP



About a month ago I wrote about the question of who should represent the U.S. in the area of channel interface standards. The point I was making was that many of the trade associations and user groups are not effectively supporting the national bodies concerned with standards. As a result, questions like the support or lack of support for channel interfaces, which is a very ordinary user need, were being decided by special interests.

In the case in point, as a member of X3 I was forced to vote either to approve a decision that the U.S. was not prepared to provide any technical support or even commentary upon a proposed interface standard or else come up with some viable way of providing support.

The question concerned had apparently been addressed very reasonably by an Ansi technical subcommittee which said specifically that "we believe that support for a channel-level interface throughout the ISO community is diminishing.

"The Ecma General Assembly has asked to withdraw standard support of the Ecma proposal for a channel-level interface as reported in Ecma/GA/72/44. The U.S. National Bureau of Standards Center for Computer Science and Technology Report on 'Means of Achieving Interchangeability of Computer Peripherals' has recommended that no attempt be made to develop a single, federal interface standard."

Now, what the European computer manufacturers want to do is of only incidental interest to me. Computer manufacturers have their own problems but computer users are the people I am concerned with.

So the area that concerned me was the U.S. National Bureau of Standards' comment extracted by the committee opposing – on the surface – a single standard. Trusting the committee to have extracted the material correctly, I did not at that time check more accurately into the background of this statement.

No Reality Behind Data

The article including my comments, and including the statement from the Ansi committee, was not out more than a couple of days when I had a call from Dr. Ruth Davis, the director of the Center for Computer Sciences in the National Bureau of Standards. It did not take her long to show me that my reading of the Ansi statement had been totally wrong.

Not that the content of the Ansi statement had been wrong – the bureau had in fact objected to a single standard. But it did want a number of standards, pointing out that a single standard was no better than the current de facto standardization and was simply playing into the hands of one segment of industry!

The words may have had the same form but the sense of the NBS report was in the opposite direction to the Ansi committee report and gave no support whatsoever for the refusal of the committee to even take a position on the Japanese proposal.

After I talked to Davis I read the report. I can't see how anyone who read it could think the National Bureau of Standards had reported against a concept such as improving the standardization of channel-level interfaces.

I don't know what to do about the Ansi committee's failure to accurately characterize the NBS support. I could of course argue against the position – but what would be the use? I have no real evidence of support.

The user groups have remained unanimously silent – perhaps because they fear that their suppliers will not give them support if they ask to have their own representation.

The large associations so far have not spoken – perhaps because they have to speak to all their members before they come up with a decision. This is understandable but at the same time it means they are so out of synchronization with the operations that a ballot is now totally meaningless.

What is the good of balloting with misleading data? Frankly I don't know, and so at this time I will only say that I plan to have the matter raised at the next X3 meeting and will report later on what happens.

In the meantime I will be happy to hear from anyone on the subject of this standard or of standards in general and how users can get support.

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Readers Respond

Dear Alan:

When you finish solving the problems of Robert D'Unger, you might tackle the problems of the *Reader's Digest* computer which has managed to shorten Robert Kahn and Associates to Robert Kahn Ass – and then addresses me as Dear Mr. Ass.

I attempted to block further mailings from them (their vice-president promised to remove my name from the list but did not) by filing it as pornographic material but unfortunately I did not keep the original envelope.

Trusting that their computer is one that never forgets a title – and knowing that their vice-president has no control over whom they mail to – I look forward to receiving the next one, at which time I will have it classified as pornographic and personally objectionable to me.

Robert Kahn
Lafayette, Calif.

Must Cobol Be Inefficient? — Part I

Cobol is inefficient. Yet, like the weather, no one does anything about it.

Cobol inefficiency is a technical problem which infringes only incidentally on the world outside the computer department. It results, however, in higher than necessary monthly bills to the using department.

It also may mean that new computer applications are postponed or cancelled, as a result of the EDP department's inability to guarantee operating costs – or because EDP is no longer believed if it does guarantee these costs. But unnecessarily high charges are symptoms rather than causes. It will do us no good to ignore the technical facts which cause them. Cobol inefficiency, if it is to be reduced, must be understood on technical grounds.

The real problem is that the measurement "normal programming" is inadequate. It is impossible to determine the inefficiency of the "normal programmer." Moreover, programming is not even the correct item to measure. What is important – when studying Cobol efficiency – is the capability of the *executed* program, by comparison with the full capability of the computer itself. It is *not* the capability of two contending programming methods that matters. Instead of the comparison with another programming method, the real study has to be related to the capability of the computer system.

The question is not whether a Cobol compiler produces more efficient programs than a hand programmer, the question is whether Cobol programs are running the system at 90% efficiency, or at 20%.

The Optimization of Cobol

To make Cobol programs really efficient, therefore, will be a formidable task. It will involve the same type of pioneering that initially going to Cobol programming did in the early days. It is not an item that can be just passed off to one member of the programming staff to do in his "free" time. However, since the alternative to efficient Cobol is a major reduction in the number of Cobol programming jobs existing in the 1970's, the importance of improving Cobol efficiency cannot be overestimated.

As always a new concept starts its own jargon. For Cobol efficiency the jargon nowadays is "program optimization." One "optimizes" Cobol programs rather than stopping them from being inefficient. Unfortunately, like most pieces of jargon, the words "Program Optimization" are misleading. As mentioned before, a program is simply a set of instructions. Inefficiency only occurs when those instructions are *executed;* when data is passed through the system. It is therefore not the programs that are inefficient, but the program/data/computer system which exists when the program is being executed that is inefficient.

Appreciating that it is the *executions* of Cobol programs that are inefficient, and not the programs themselves, opens up a major possibility that was ignored as long as programs alone were being blamed.

To start with, we have the item that was contributed by the programmer – the Cobol source code. This has been placed into a position within a work stream by a "scheduler." It is introduced by a group of parameter cards generally written in "JCL" or job control language. These may have been written by any one of a number of different people. We now have two independent sets of control variables, the scheduling and the JCL, that we can use without bothering the programmer.

The job is then followed by "input data" which is probably processed against some "files." These files themselves may change in size according to their current position within a particular time cycle, such as a week, a month or a year. Two more variables which can affect the operational efficiency, without involving the programmer.

The program code, as written by the programmer, has also been changed by one of a number of compilers into a machine code that is being executed under an operating system. The operating system is one that has been tailored to the particular needs of the installation by generating it under the control of various control cards.

Nor should we forget the control entrusted to the machine operator. He is often able to allocate the physical devices – tape units and disk drives. He may have the tapes and disks ready for loading, or he may not. He may schedule the machine well, or badly from the point of view of throughput. He also can certainly be considered to be a major factor.

That gives us eight sets of variables – the source program, schedule, JCL, input, file sizes, compiler, operating system, and operator – only one of which is under the control of the programmer.

Nor is this the end. Many other people, by their conduct, can make the profile of a particular job efficient or inefficient, and so contribute to the profitability of the installation. Surely in all these areas we can find methods for improving efficiency without having to leave everything to the programmer. With this available, surely we can make Cobol efficient in a systematic manner.

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Study Asks: Are Synthetic Benchmarks Possible?

By Don Leavitt
Of the CW Staff

FALLS CHURCH, Va. – The development of a representative library of standard benchmark programs focusing on specific DP tasks (rather than entire applications) appears to be technically feasible, according to Maj. Ed Spradling, assistant director of the Army's Business System Evaluation Directorate.

These benchmarks would be operational but synthetic programs composed of variable task-oriented instruction streams, data files and procedures from which the user can extract and tailor a sufficient number of programs to represent his workload profile.

By overcoming the problems involved in creating or extracting "real" benchmarks, Spradling said, the standard benchmarks – if they can be developed – should provide both user and vendor with a better way of evaluating proposed hardware systems.

While the task-oriented approach should make benchmarking more useful to both user and vendor, it should also ease the development of the logic that should be built into each of the modules from which the user/vendor creates his workload profile, he added.

Basic Tasks Identified

Spradling is chairman of a Department of Defense steering committee organized last fall to work up these standard benchmarks for DOD use. His committee and a task group under it have identified nine basic DP tasks that "probably" should be in the benchmark library: Modified Sort; Edit; Sequential Update; Indexed Sequential Update; Random Update; Report Extract; Compute; Remote Inquiry and Remote Update.

To shape these overall modules to the user's profile, Spradling sees a software program in the user's foreground running at the same time as his application program to find the "functioning factors" appropriate for the job.

It would be used to identify how much of the application systems being studied was devoted to each of the basic tasks.

Spradling's group is working on the logic of six of the nine basic modules it has identified. Beyond that, it has begun to shape the concept behind the standard benchmarks into a work statement that is soon to be released as a request for proposal for a study contract.

Under the RFP, Spradling will ask the successful bidder to look at the concept and validate it "to some degree." Is it workable? Is there anything that should be added? Deleted? These are the questions he hopes to have answered.

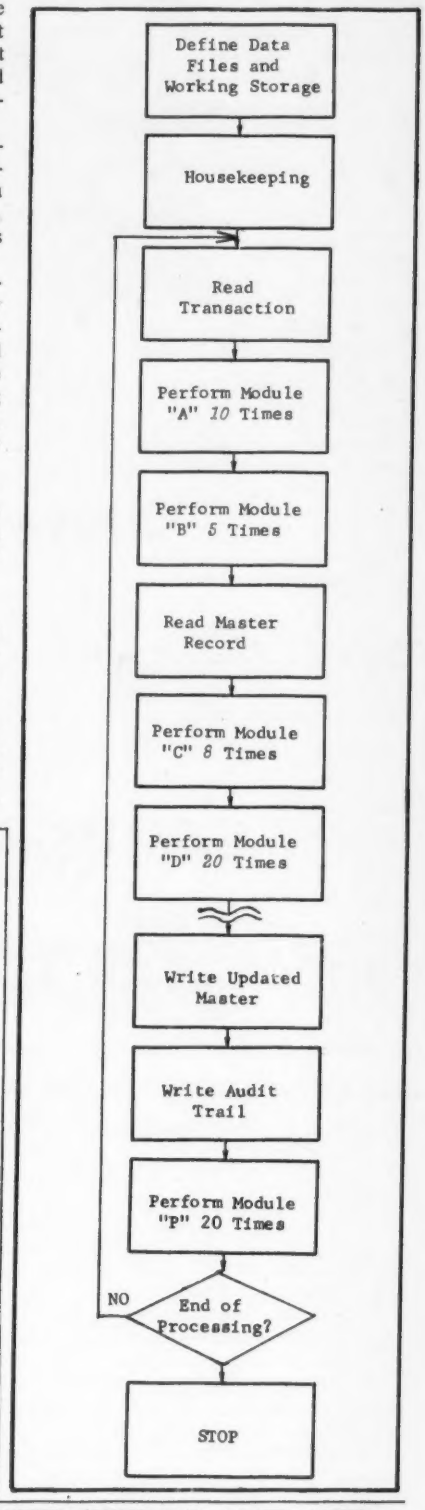
More importantly, in his view, the contractor will be asked to develop a generalized system design as appropriate for a method of profiling the user's workload, making it as transparent to the user as possible.

Spradling is enthusiastic, but not starry-eyed about the possibilities of actually getting the standard benchmarks operational. He anticipates that by year-end "we should know exactly where we are going. If it looks like we have something solid, we'll proceed." On the other hand, he admitted that his effort "may" be going up a blind alley.

Standard benchmarks may prove to be inappropriate for some evaluations, he said, noting that unique benchmarks might well be needed to check out very large systems.

He said his project is more precise than the National Bureau of Standards Task Group 13 which was organized earlier this year to study benchmarking in general.

Spradling's directorate is part of the Army's Computer System Selection and Evaluation Command, located in the Nassif Building here.



Each module within this synthetic update performs one type of operation. Parameter entries control the extent of each operation and how often it is repeated. Module A, for example, might include moving five characters 40 times; moving 1,000 characters five times; and moving 500 characters 15 times.

'Bacus' Presents System Usage, Rerun Data in Management Terms

NEW YORK – IBM 360/370 users who have accepted the concept that monitoring software can be useful, but who have been disappointed with the voluminous and hard-to-read output of some current systems, now have a chance to get what they're after with the Booz Allen Computer Utilization System (Bacus) package from Booz Allen & Hamilton Inc.

Bacus comes in two versions, one geared to Job Accounting data generated by DOS and the other to System Measurement Facility (SMF) generated by OS/360-370. That in itself is not unusual, but its extensive use of graphic displays – some printed directly on the 1403 line printer, others manually created from simple report output – sets Bacus apart, a Booz Allen spokesman said.

Bacus also focuses more sharply than other systems on editing accumulated data so the data makes better sense than it would if taken at face value. The evaluation of apparent rerun statistics is one of the Bacus strong points, the company noted.

The package works with codes carried in the JCL job stream to determine if a run is normal production or a rerun, and if it is a rerun, to show the reason for it. Management should be aware, the spokesman noted, of whether reruns are caused by operators or by machine problems so they can take corrective action.

The Bacus approach also allows for varying the number of production runs for different programs, so the mere fact that a program is run more than once in a given day is not necessarily interpreted as a rerun situation. By pegging this code scheme program-by-program, however, excess runs can be quickly spotted as such and reported, the spokesman said.

Bacus requires at least 90K bytes of main memory even under DOS, although the company said it could make some modifications if it has to fit a smaller partition size.

The package sells for $7,500 for "real" memory systems under either OS or DOS, and $10,000 for a VS version.

Booz Allen is at 245 Park Ave., 10017.

Source of Cobol Labels Listed

WILBRAHAM, Mass. – DOS/360 Cobol users can have better documentation than IBM's compilers provide, but avoid the sometimes overwhelming output of flowcharting packages, with the Cobol-Map II system now available from Hansco Data Processing Inc.

Cobol-Map II generates two listings normally as part of the user's compilation process. The first list is a fairly normal alphabetically organized cross reference directory, indicating by line number the source program references to every data and procedure name.

The second report, which Hansco said is unique, is a substitute for the Cobol compiler's listing. In addition to information usually available in that listing, the Hansco report charts bidirectionally the label references to and from each statement in the program.

With this listing, the first time a label is encountered, the system provides a table of all line numbers that make reference to the label. At each statement that refers to symbolic labels, Cobol-Map II lists the line number of the label origins, in the order of their appearance within the statement.

While the reports themselves are direct carryovers from the earlier Hansco Cobol-Map, they now include a feature which flags statements that alter the contents of a labeled field, if it is, for example, the receiving field of a MOVE instruction. By marking those statements that change a field's contents, the listings should permit more rapid debugging, Hansco said.

Cobol-Map II runs three to five times faster than its predecessor, largely because it is now a one-pass system rather than a five-program operation. It also requires much less JCL preparation.

Cobol-Map II is priced at $249.95 and is made up of relocatable modules. Documentation, an interface with the user's compiler and a year's maintenance are also part of the package.

Hansco can be reached through P.O. Box 236, 01095.

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Cooperative R&D Work Through AMM Saves Manufacturers $50,000 Annually

CHICAGO – A decade of cooperation on research and development in industrial engineering has helped companies participating in the Advanced Manufacturing Methods (AMM) project sponsored by IIT Research Institute save from $50,000- to $200,000/yr on operating costs, according to AMM manager Eugene L. Magad.

AMM now includes representatives from 38 companies from Europe, the U.S. and Japan. Organized around a steering committee and a series of working groups, the project has focused on software and quantitative techniques that provide better analysis, planning and control of manufacturing operations.

AMM was set up ten years ago with a small group of sponsor companies who put up seed money to get the project started and who continue to support it financially. New participants are welcome, but the most important requirement, Magad emphasized, is a genuine willingness to take part in the R&D activities.

Companies in the automative, appliance, electronics and business machine industries form the largest segment of support within AMM, Magad said, although the techniques and tools developed are product independent.

Future work under consideration includes assembly system capacity planning, model grouping, mixed model assembly line scheduling, survey of real-time systems for shop floor control, machine and equipment location planning and multiple shared man-machine simulation programs.

Fees for new clients are $20,000 for the first year, which includes all users' and programmers' manuals, 10 man-days of advisory visits, technical meetings, steering committee representation, access to computer software plus mail and telephone problem-solving.

Continuing participants receive all of the foregoing services for $7,500/yr with the number of days of advisory visits reduced to four.

IIT Research Institute is at 10 W. 35th St., 60616.

'Interrogator' Puts Report Prep, File Maintenance on Load-Go Basis

ST. LOUIS, Mo. – Non-DP users with access to a 32K 360 operating under DOS have another report generator and retrieval system to consider. The Interrogator from Simpli-mation Inc. is described as a utility system that includes many functions related to report preparation, file generation and file maintenance.

Interrogator is not intended to replace programming languages, the vendor stressed. Rather it is a load-and-go processor shaped to the user's needs through parameterized entries, or default options in lieu of specified entries.

The system can be used to process two files simultaneously, or as many as nine files consecutively. Processing of more than two files is possible as an added feature.

The system is similar to many others in its support of fixed and variable length, blocked and unblocked tape records, and either sequential or index-sequential disk files. But it is distinguished from many other report generators by its support, as both input and output, of 1400 series disk files.

In addition to allowing reformatting, expansion and contraction of files, and extraction of summary and detailed information from the files it is processing, Interrogator also includes a range of operation codes to determine the sequence of processing steps. Comparisons, sampling, counting, and bit testing or comparing are all available, including Boolean logic tests.

The Simpli-mation system utilizes five coding forms and in that respect is very similar to classic RPG systems. Sensing of control-level breaks, printing of all subtotals and rolling of totals to higher levels when breaks occur, and automatic page headings including date and page number are part of Interrogator.

Interrogator operates under OS, DOS or TOS, the company said, and may be cataloged under those operating systems that support that facility. It uses 20K bytes in an OS environment plus sufficient room for the largest file blocks. Under DOS it uses 12.5K bytes plus buffers.

Simpli-mation is at 410 Mansion House Center, 63102.

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Data Briefs

Cassette Feature Added To TC-71 Keyboard/Printer

RALEIGH, N.C. – Terminal Communications has added a tape cassette feature to its TC-71 keyboard/printer terminal. The TC-71 is designed as a replacement for the IBM 2740 communications terminal.

The TC-74 Tape Cassette Unit allows messages to be keyed into the terminal in an off-line mode and transmitted later. Similarly, data can be received onto the tape cassettes and read from the tape at any time.

The TC-74 costs $2,575 and rents for $81.50/mo. The TC-71 printer terminal costs between $4,800 and $5,700 or $165/mo. Delivery is 30 to 60 days from 3301 Terminal Drive, 27611.

RCA Teleprinter Offers APL

CAMDEN, N.J. – The RCA Model 38 ASR teleprinter is now available with an optional APL coding system.

The unit prints the 88 APL character set.

The Model 38 ASR is available as a private line or with optional data set. The private line version with APL coding leases for $75/mo including service from the Cherry Hill Offices, 08101.

Stores Combine POS, On-Line Credit

SEATTLE, Wash. – Nordstrom, Inc., with 12 stores in Washington and Oregon, has combined an electronic point-of-sale system with on-line credit authorization in all its stores.

The basic units are 215 NCR 280 retail data terminals installed on the selling floors. Each terminal is connected to an NCR 723 data collector, which in turn communicates with the NCR Century 101 computer located at the firm's Seattle headquaters.

During business hours, the Century 101 computer is dedicated to credit authorization. After the stores close at night, the Century 101 polls the terminals. After processing, NCR 260 data terminals thermally print a variety of reports for management.

User Goes on Dataroute

OTTAWA, Ont. – M. Loeb Ltd., a wholesale grocery distributor here, has become one of the first non-time-sharing subscribers to the Dataroute, the new Bell Canada digital transmission system.

Installation was completed on June 1, 1973 between the company's IBM 370/145 located at the corporate data center here and a Remcon 2780 terminal located in Montreal. Present installation of a 24-hour, 4,800 bit/sec service will generate a savings of $3,000 annually in transmission costs, the firm stated.

The company plans to install additional systems in its other Canadian divisions as the Dataroute expands.

Tests Show

Users Can Share Satellite Circuits

By Ronald A. Frank
Of the CW Staff

NEW YORK – Experiments now being conducted on government-funded satellite data communications networks may help overcome transmission propagation problems when commercial packet-switched satellite systems become operational.

Researchers associated with the Arpa and Aloha communication networks have found several approaches to avoid transmission "conflicts" when more than one data user accesses a shared satellite channel simultaneously.

A stationary satellite acts as a "pure" transponder repeating whatever it receives and beams this transmission back down to earth, according to Leonard Kleinrock, professor of computer science at the University of California.

The broadcasted transmission can be heard by every user of the system, and in particular a user can listen to his own transmission on its way back down, Kleinrock told NCC attendees at a session on satellite packet communications.

When a portion of one user's transmission reaches the satellite, while another user's transmission is being transponded, the two will "collide and destroy" each other, he said. One solution to this problem is a random retransmission delay to spread the conflicting packets over a period of time.

Another solution is to allocate fixed time segments or "slots" whose duration is exactly equal to the transmission time of a single packet. If all packets begin their transmission at the beginning of a slot, conflicts will be restricted to a single slot duration. This type of scheme is known as a "slotted Aloha" system, Kleinrock said.

A third method for allocating the usage of a shared packet satellite channel is to schedule the users and assign them to specific time periods. This approach is known as a reservation system.

When satellite time slots are freely utilized by an user having data traffic, there is a "channel utilization limit of 36% to insure that [transmission] conflicts are not too frequent," according to Dr. Lawrence Roberts, director of information processing research for the Arpa network.

Despite this limit and possible associated transmission conflicts, the free channel utilization method is preferrable to preassigning time slots to user stations and having them be unused, Roberts said. The free usage by any station in the network is implemented in the Aloha system between Hawaii and California.

Common Queue

In order to further improve on the Aloha method, a reservation system can be introduced, Roberts suggested. Under this method, the satellite channel is divided into time slots of 1,350 bits. At required intervals a slot is subdivided into smaller segments which are used for transmission reservations and acknowledgements. The smaller slots are used on a contention basis with the Aloha technique. This reservation system creates one common queue for all stations.

Roberts also described some of the operating data gathered on the Arpa network. Experience on the Department of Defense net shows the data traffic is proportional to the total dollar value of computer services being moved through the system, he suggested.

"The total traffic generated by one dollar of computer activity is about 315 communications packets, with 50% being transmitted in each direction. If $200,000/yr in computer resource usage is generated within a geographic region, 2K bits of data traffic will be produced of which one-half or 1K bit is leaving the region, he said.

Within the next few years between 0.25K bits and 10K bits of data traffic will be exchanged internationally, Roberts predicted. In a related forecast, David Walden, senior computer scientist at Bolt Beranek and Newman said that the first shared satellite channels will be in service by the end of this year.

FCC: Vital Statistics Missing From Bell Claims on Net Harm

WASHINGTON, D.C. – The Federal Communications Commission staff has told AT&T that vital information is missing from its recent submission on harm caused by customer-provided equipment connected to the phone network [CW, May 16].

In a letter from the common carrier bureau, AT&T was told that the FCC staff has not found "statistically meaningful differences" between the harm caused by telephone company-provided equipment and customer-provided units.

The FCC staff said "vital information regarding the sampling methodology is missing" from the AT&T submission, and "key statistical parameters are not provided." The letter said figures provided by Bell "indicate that the rate of customer-provided equipment troubles . . . in comparison to the total number of Bell installed interconnected units is falling." This "tends to contradict some of the statements" from AT&T about harm, the FCC staff said.

Bell was asked to reply within 30 days to 13 specific questions regarding its statement.

The FCC letter also challenged the AT&T claim about unnecessary dispatches of repairmen by citing the Rochester Telephone Corp. Network Protective Device (NPD). The NPD has a provision that allows troubles to be tested from the central office without a visit to the user site, the FCC letter said, and it asked AT&T whether the Bell System planned to "incorporate remote testing features in conjunction with its use of connecting arrangements."

AT&T was asked to meet with FCC staff experts "as soon as possible" to review the "sampling methodology" of its study on harm.

Sycor 250 Replaces IBM 3270s

ANN ARBOR, Mich. – Sycor Inc.'s 250 Series of intelligent on-line terminals is plug-compatible with the IBM 3270 at a lower cost, the firm said.

The firm also introduced three printers to be used with the terminal.

The terminals have 8K bytes of read-only memory and up to 6K bytes of programmable memory, with all of the terminal's operating functions contained in the read-only memory.

The 250 Series is designed to operate as a remote communications terminal on multipoint or point-to-point private lines. The unit transmits data at up to 4,800 bit/sec in binary synchronous.

The printers – Models 2581, 2582 and 2583 – operate at 40-, 80- and 165 char./sec, respectively. All are capable of printing two separate continuous forms at once.

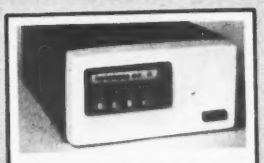
The Model 250, in clusters of four, rents for $480/mo on a one-year lease including maintenance. Purchase price is $15,650 for a cluster of four.

A Sycor spokesman said these prices compare with the IBM 3270 rental of $525/mo or $22,460 purchase.

Stand-alone price for the Model 250 is $122/mo or $4,310. The Sycor spokesman compared this with $135/mo and $6,100 for IBM's 3270.

The 2581 printer rents for $180/mo, including dual tractor feature and maintenance. The cost of the 3582 printer is $200/mo or $7,000 purchase, and the 2583 printer leases for $255/mo or $9,000.

Sycor is at 100 Phoenix Drive, 48104.



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A concise, yet complete book on the subject has been written by an EDP consultant with 14 years of experience. THE DP FINDERS GUIDE includes chapters on — locating companies that pay fees, how much they pay and when, how to approach them, how to expand your contacts and make findings, how to submit findings and protect your fee, how to avoid the deadly mistakes, and other vital information required to successfully conduct a finders activity. Save 50% by ordering direct from publisher at the pre-publication price of $12.45 — this one-time ad is for the limited number available. Payment must accompany order.
Western Venture Press, Box 402, 1955 Ulster Ave., Denver Colo.

Features Debut At NCC

Communications Units Enhanced

By Ronald A. Frank
Of the CW Staff

NEW YORK – Enhancements to previously introduced data communications systems were much in evidence at the NCC. Among this type of product was the programmable communications termination unit from Collins Radio Co., new diagnostic features for the General Datacomm Industries 201 modem, a Touch-Tone data entry capability on the General Computer Systems Inc. 2100 key-entry system, and a "Mini-Tec" CRT unit from Tec Inc.

Collins, Dallas, Texas, showed its programmable channel termination group (PCTG) that can operate as part of its time division exchange TDX-L1 system or in similar communications systems. The PCTG unit can control up to 64 lines in the 50 bit/sec to 9,600 bit/sec (low-speed) or the 2,000 bit/sec to 50 kbit/sec (high-speed) categories.

The Collins unit provides capabilities similar to the IBM 3705 and can also adjust bandwidth based on the terminal equipment that is interfaced and the programmability desired by the user. Both point-to-point and multidropped lines operating either in Ascii or Ebcdic can be handled. The unit can have from 8K to 32K of storage and costs $40,000 to $70,000 depending on configuration.

Diagnostics on Modem

General Datacomm introduced diagnostic features for both the dial-up and private line versions of the 201 modem. The 201-9 operates at 2,400 bit/sec on private lines with the Dataloop feature that allows remote loopback of the data set on the digital side in either point-to-point or multipoint nets.

Combined with a companion Analoop feature on the analog side of the line, the 201-9 at a remote site can be analyzed with respect to terminal, modem or line failure – all from a central site, allowing users to simplify fault isolation. The 201-9 costs $900 plus $300 for the diagnostics on multipoint systems or $200 for the diagnostics on point-to-point nets.

The 201-5 operates on dial-up lines and has built-in capabilities to detect DC supervisory signals. This means the modem can recognize when a circuit has been inadvertently disconnected, regardless of the reason. In a comparable Bell 201 data set if an EOT signal is not transmitted, no disconnect takes place and both the phone line and the terminal or CPU can remain dedicated to a dead line, the firm said. The General Datacomm 201-5 has the capability to detect and correct such a situation. The data set costs $1,200 from the company in Wilton, Conn.

Push-Button Input

General Computer Systems, Dallas, Texas, added a Datatone controller to its source data entry system that allows any Touch-Tone phone to enter data. The data entered on the phone is stored on disk and then entered onto CPU-compatible tape after formatting.

The operator at the phone can verify the data entered into the system by listening for two types of tones generated at the central site. A correct entry will cause a steady tone to be generated while an invalid entry will result in a "warbling tone" being sent to the operator. The controller can handle up to 32 phone lines and costs $635/mo, plus $35/mo for each phone line.

TEC Inc. introduced its small Mini-Tec CRT for TTY replacement applications. The CRT will be used as a data input unit for minicomputer-based systems. The unit can operate at six switch-selectable speeds from 110 to 9,600 bit/sec using Ascii code. It can handle asymmetrical data rates and contains a 960-character buffer.

The display can be interfaced with cassette tape or printer peripherals through an RS-232 plug, and it is compatible with Bell 202 or 103 modems or their independent equivalents. First deliveries are scheduled for October from Tucson, Ariz.

Satellite Transmits Airline Reservations

Special to Computerworld

SYDNEY, Australia – Qantas Airways is now operating one of the longest computer links in the world between its reservations computer here and the airline's new North American Headquarters in San Francisco.

Using the Pacific Ocean Intelsat IV satellite, Qantas is sending its data 22,300 miles above the earth. It takes about three seconds for a message to be sent from San Francisco to Sydney, processed and displayed on a computer terminal back in San Francisco.

Qantas' computer, known as Qantam II, is based on two IBM 360/65 processors which work with the IBM developed Ipars (International Programmed Airlines Reservations System) through a Honeywell communications front end. Ipars is housed with two additional IBM 360/65s for general data work.

As operating systems get more complex, efficient use of hardware gets more difficult. So a variety of new software tools have been developed to aid users in making their systems more efficient. DP evaluation programs analyze equipment utilization; simulation packages show how hardware will function before it's installed; hardware monitors check whether individual pieces of equipment are functioning according to specifications; and optimizers help make process coding more efficient.

These are some of the products we'll be looking at in our July 25th Software Supplement, edited by *Computerworld's* software specialist, Don Leavitt. Much of the information will be based on the experiences of companies who have used these products. And our research has shown that they can be quite effective. For example, one user we've talked to reported a 33% decrease in running time on a package of 13 programs after they implemented a computerized efficiency analysis.

Greater efficiency for your EDP system. That's what you'll be learning more about in our July 25th Software Supplement. If you're a user, it'll be well worth the reading. And if you're marketing in this area, it'll be well worth the advertising. Closing is July 6th. Don't miss it.

For more information, contact the nearest *Computerworld* Representative.

Boston	New York	Los Angeles	San Francisco
Bob Ziegel	Don Fagan	Bob Byrne	Bill Healey
(617) 332-5606	(212) 594-5644	(213) 477-4208	(415) 362-8547

Or write to Judy Milford, Computerworld, 797 Washington Street, Newton, Mass. 02160

Efficiency's the word in Computerworld's July 25th Software Supplement

Everybody's talking about the great things Honeywell's doing for big computer users. And not-so-big users.

Our newly announced Model 6025 system. It offers new technology including MOS memory. It's an easy, economical way for small-scale and medium-scale computer users to enter the large-scale systems environment.

Our other highly successful Series 6000 systems. They're designed for a broad spectrum of business-minded users, and now they're more appealing than ever because of important improvements.

Our recently announced Multics System. It's designed for research, academic, and network-oriented users who need unique security, programming, and centralized data base features.

New Low-Cost Entry to Honeywell Series 6000. Regardless of the make of your present computer, if you're a small- or medium-scale user who wants expanded capabilities and long-range growth opportunities, Honeywell's new Model 6025 system is big news.

Easy Expansion. The Model 6025 is the new beginning system in Honeywell's Series 6000 family of large-scale computers. It competes aggressively in a lower range of processing capability, while retaining upward-compatibility features for significant future growth capability.

Easy Conversion. Particularly geared to the COBOL user, the 6025 system includes conversion packages for fast field-upgrade from less powerful and competitive systems, and Honeywell's traditional broad system support and training.

Easy-to-Use Software. The 6025 represents an inexpensive first step with Honeywell's General Comprehensive Operating Supervisor (GCOS) Executive System. GCOS is the software that automatically performs all Series 6000 data processing functions. It's widely acknowledged to be one of the best software products in the industry.

Multidimensional Processing. The Model 6025 can acquire multidimensional capabilities by adding a front-end network processor, and grow into a full range of multiprogramming operations. It can handle batch processing, remote job entry time sharing, message switching, and transaction processing, while maintaining constant access to a common data base.

Big Start on a Big Future. The Model 6025 can serve a company's far-flung operations by means of a nationwide or even worldwide communications network. You can achieve economies of scale to help your company stretch its data processing budget today... and for years into the future.

Our Series 6000 Computers. Now they run stronger than ever.

We've also made lots of important improvements in existing models of our large-scale Series 6000 systems—improving still further the multi-dimensional processing capabilities of Series 6000 and GCOS.

New Capabilities for Management of Network Processing

We've developed new software that provides improved control over the computer communications network. It's called Network Processing Supervisor (NPS)—a communications operating system resident in the 6000 system's DATANET 355 front-end network processor.

The DATANET 355 hardware is one of the many things that helps make Series 6000 so powerful. It performs the routine communications jobs associated with network management. Terminal and line control functions are transferred from the main computer to the network processor, thereby conserving the central system resources, reducing system overhead, increasing reliability and improving system throughput.

Our new NPS software for the DATANET 355 lets the user monitor, analyze and control his network right at the main site—without interfering with the normal system activities. Advanced features include:

1. Statistical recording and reporting to provide current and historical information about network operation.
2. Supervisory control, making it easy to monitor and control the network events when necessary.
3. Complete system and data integrity, with automatic restart/recovery and support of fail-soft configurations.
4. Capability to journalize data for data integrity and information retention.
5. Customizing features to meet individual requirements.
6. A flexible and powerful message switching capability for terminal-to-terminal information exchange, completely integrated with the other NPS functions.

Satellite Systems for Regional Locations

Our new remote network processor doubles as a remote batch processor and as a remote message concentrator. You can place one of these satellite systems in each regional center of your computer network to handle local processing rapidly—at a low cost. At the same time, they tie in your regional centers to the central system.

Broader Fail-Soft Capability

We've made the fail-soft capability of the upper range of Series 6000 systems available on the smaller 6030 and 6040 models. Such a fail-soft system has at least two of every system module, all running under the control of a single operating system. Should any module fail, only that module ceases to operate. The system continues to operate, making optimum use of the available modules and still providing all of its multidimensional capabilities.

There are multiple benefits from such a configuration:

1. Total backup for every module within the configuration offers high system reliability.
2. A unique on-line test and diagnostic capability permits removing a module from the system for servicing while the other modules continue to operate, thus greatly improving system availability and up-time.
3. Enlarged multiprogramming and multiprocessing capabilities make possible system performance to match the workload—for better throughput.
4. The price/performance is significantly improved, compared to the cost of two separate systems with the same throughput capability, as only one operating system is required to schedule and govern the entire hardware resource.

Larger Memory Sizes

Expanded memory sizes throughout Series 6000 offer users more latitude for growing applications and services. As many as four million bytes of memory can be used to do more work at the same time. And bulk store capability offers supplementary memory for high-speed data input and output—to strengthen time-sharing and transaction processing performance.

More Peripheral Options

We've added new peripherals (including new types of magnetic tape drives, and a new card reader, card punch and printer) to increase the range of choice for matching input/output requirements with system performance.

GCOS Operating System Enhancements

We've added a number of features (such as the File Management Supervisor) to the GCOS executive system to provide more data security and make data management easier for your staff.

Our Multics System. A great new way to bring the resources of the computer to multiple users.

Honeywell's Multics System represents an innovative concept for generating, controlling and distributing computer power—a concept of computer usage so advanced that it redefines the meaning of time-sharing and interactive processing.

(Multics stands for Multiplexed Information and Computing Service.)

Multics is a unique combination of computer hardware, software, communications and supervisory techniques. We believe it's one of the most powerful and sophisticated systems in the world.

Maximum User Orientation

Honeywell's Multics System incorporates many of the most user-oriented programming and supervisory techniques yet devised. These techniques are available to all users automatically through the Multics operating supervisor. For example, the Multics System provides small amounts of service to small users, and large amounts to large users, within wide limits, on immediate demand, and with maximum efficiency. For billing and control purposes, it keeps track of the amount of service each user receives.

Advanced Virtual Memory

The Multics System offers the most advanced virtual memory capabilities available. Virtual memory was included in the design from the very beginning. The primary purpose of the Multics System virtual memory is to achieve controlled sharing of information among the system's users.

Information is organized into *segments*. A segment may contain programs or data, or may be a directory of segments. Segments and their directories are organized into a single "tree-structured" hierarchy which forms the storage system for users, for administrative and accounting information, and for the software system itself.

The movement of this information from the main memory back and forth to secondary storage is completely automatic. Programs and data are *paged* through main memory. Only the currently active pages are held in main memory, with the Multics System fetching additional pages as required.

Increased Programmer Productivity

Explicit paging and segmentation techniques are automatically applied to the operating system, to all programs, and to data bases within Multics. The laboriously detailed programming typically needed to manage file inputs and outputs to and from memory is thus eliminated. A programmer may extract, revise and reorder at will from existing programs, just as though he were combining photocopies of paragraphs and chapters from a number of different books in a library. And just as in photocopying, the programs are not affected but remain intact and accurate.

Flexible, Easy-to-Use Programming Environment

The system has been implemented in PL/I, which is also one of the user's main programming languages. This lets him interface his application to the system on a module-by-module basis rather than through a single applications/system interface as provided by conventional systems. The use of the PL/I language enforces a modularity and consistency of programming style which makes possible the continuous evolution of software.

Open-Ended Growth Capabilities

The combination of the most powerful virtual memory system available and the advanced hierarchical memory "tree" concept, both of which encompass main and secondary storage, provide the Multics System with an essentially open-ended capability. Huge quantities of symbolically addressable secondary storage can be added to accommodate almost any requirement. Processors and memory can be added or removed from the system without interruption to users. And there is no need to shut down for system update, for accounting or management functions, or for user errors.

Decentralized Administrative Structure

Unique administrative monitoring and control features are used to allocate resources so that even a small user is protected.

Multics defines three distinct levels of administration: system, project and user. The system administrator allocates resources and memory to projects; the project administrator allocates the assigned resources among the users on his project. Each user, in turn, can allocate his assigned resources among other users.

Sharing of Information

Multics permits controlled sharing of programs and data through the use of the access control mechanism. The majority of segments on the system such as compilers, library routines and user procedure segments are pure procedures. Only one copy of them is needed regardless of the number of users who may be executing them. Having only one copy provides that 1) information never loses its identity in a system-wide sense, 2) the outbound portion of system traffic is reduced, and 3) use of main memory is greatly reduced.

Dynamic, Multiple-Level Security Control

Privacy and security for protected data and files were a primary Multics design consideration, and were implemented into the Multics hardware, resulting in superior security provisions.

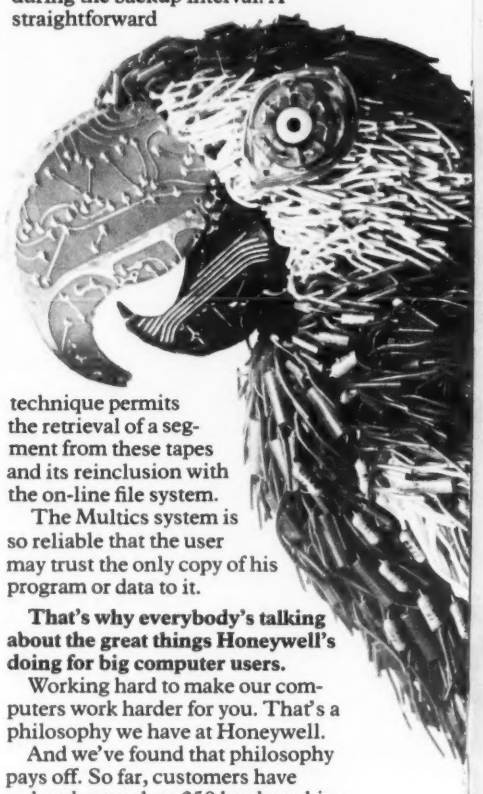
A uniquely effective concentric-ring security structure controls individual user access to selected programs and data – in addition to the more traditional privileges of read, write, and/or execute access.

The user may define the names of persons who may have access to each segment and the type of access they may have. Consequently, access to data may be precisely tailored to the application – rather than being restricted by the system.

The ring protection features, and paging and segmentation techniques provide close to ideal on-line system characteristics for security control.

A Reliable File System

Information which is stored on-line is protected by an incremental back-up system. This system copies onto magnetic tapes every segment whose contents have been changed during the backup interval. A straightforward



technique permits the retrieval of a segment from these tapes and its reinclusion with the on-line file system.

The Multics system is so reliable that the user may trust the only copy of his program or data to it.

That's why everybody's talking about the great things Honeywell's doing for big computer users.

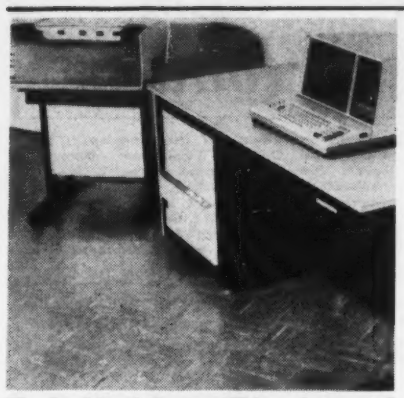
Working hard to make our computers work harder for you. That's a philosophy we have at Honeywell.

And we've found that philosophy pays off. So far, customers have ordered more than 250 hard-working Series 6000 systems.

If you'd like to see Multics or Series 6000 demonstrated, arrangements can be made through your nearest Honeywell office. Or for more information write: Honeywell Information Systems (MS 061), 200 Smith Street, Waltham, Massachusetts 02154.

The Other Computer Company:

Honeywell



The Lockheed System III is an integrated configuration of minicomputer hardware and software that is 98%-compatible with existing IBM System/3 RPG II programs.

'98% Compatible'

S/3 Replacement Costs 55% of IBM Price

By Michael Weinstien
Of the CW Staff

LOS ANGELES – System/3 users can obtain a replacement system from Lockheed Electronics Co. at about 55% the cost of the S/3.

The Lockheed System III is an integrated configuration of minicomputer hardware and software that is 98% compatible with IBM System/3 source-level RPG II programs.

The processor unit has 16K bytes of core memory field-expandable up to 64K bytes in 8K or 16K byte modules.

Mass storage is provided by a 5M-byte disk subsystem. The drive uses a removable pack of the IBM 5440-type, and one fixed disk.

A keyboard with video display provides operator interface to the system. A printer provides hard-copy output at a rate of 100 char./sec across 132 columns.

Tape Options

Options include magnetic and cassette tape. Magnetic tape units are 9-track, 800 bit/in. and the drives are provided in 45- and 75 in./sec. speeds.

Cassette tape storage is 360K byte/track. These units are Ansi/Ecma-compatible with multidrive systems providing sort/merge capability. Tape speeds are 6 in./sec on write and 24 in./sec on read.

Both 80-column and 96-column card equipment can be used in the system. The 80-column peripherals include a 600 card/min reader and a 30 card/min punch. The 96-column equipment includes a combination reader/punch with 300 card/min read and 60 card/min punch.

Up to four additional disk drives can be added. Installation of an additional controller provides for four more drives.

Converting Ebcdic to Ascii

The IBM System/3 uses Ebcdic while the Lockheed uses Ascii, so Lockheed is supplying a free conversion program, a spokesman said.

Basic operating system is a version of DOS that operates in 6K bytes of core and utilizes a single disk drive. This operating system handles all system supervisory control, file management and disk utility functions.

A system control language (SCL) provides the control information to DOS. DOS can operate in a single job entry mode where the SCL is entered conversationally through the keyboard, or in batch mode, Lockheed said.

Source files contain symbolic code of programs in either RPG II or assembly language.

The Lockheed version of RPG II operates in a 24K byte system with one or more disk drives. The internal collating sequence is in Ascii.

Typical Price

A typical system consisting of central processor with 16K bytes of memory, 5M-byte disk subsystem, line printer, video display and keyboard console would cost $37,500.

This system could support the RPG II compiler, DOS, a sort/merge capability, data editor and source editor.

A similar system from IBM would cost about $65,000, a Lockheed spokesman said.

The Lockheed system will be maintained by the firm at 6201 E. Randolph St., 90040.

Calcomp 915/1036 Drum Plotter Includes Program-Selectable Pens

ANAHEIM, Calif. – Calcomp has released the 915/1036 drum plotter as a replacement for the slower and more expensive 1136.

The new top of the line plotter operates at 14 in./sec with a resolution of 0.002 in. Three program-selectable pens and interchangable drums (from 12- to 36 in. wide) are standard equipment. The multiple pens permit users to plot with multiple colors, Calcomp said.

To assure accuracy, especially when plotting on gridded paper, it is possible to compensate for differences in paper width.

The 915 portion of the system is a controller permitting use of optional programs stored on magnetic tape cartridges. Core upgrades are available to expand the basic 8K words to a maximum capacity of 33K words.

Five I/O channels allow integration of various input devices such as card readers, teletypewriters, flatbed plotters, or COM units. Use of these channels allows users to make the 915/1036 plotter the operating heart of a computer graphics system, the firm noted.

The standard magnetic tape unit is a 7-track, 200-, 556-, or 800 bit/in. NRZI unit. Options include a 9-track, 800 bit/in. NRZI unit; an operator selectable 7-track, 200-, 556-, 800 bit/in. or 9-track, 800 bit/in. unit; or a 9-track, 1,600 bit/in. phase-encoded unit.

Price of the 915/1036 is $22,720 which includes one-year maintenance from 2411 W. La Palma, 92801.

Future NCR Terminals, CPUs May Have Field-Alterable ROMs

DAYTON – NCR has developed a read-only memory (ROM) which can be reprogrammed in the field without circuit changes, which may be available in user products next year.

Thus, one Earom (electrically alterable read-only memory) has the potential to serve different applications by field-altering the memory chip, NCR explained.

Previously, separate chips had to be made for each application, the firm noted. The Earom is expected to reduce cost by eliminating the development costs for unique conventional chips in future hardware, it added.

The MNOS-LSI (Metal Nitride Oxide Silicon-Large Scale Integrated) chip measures 114 by 140 mils. The standard version is a non-volatile, 1,024-bit read-only memory applicable to moderate-speed, general-purpose data processing applications, according to a company spokesman.

The bits are organized as 256 addresses with four output terminals each. Memory contents can be erased and altered externally from the device leads with no restrictions. Output can be either TTL- or MOS-compatible.

Looking Ahead

Controller Handles Dual-Density Drives For Sigma Processors

IRVINE, Calif. – A controller for Xerox Sigma central processors that handles both single- and double-density disk drives is available from Telefile Computer Products.

The DC-32X disk file controller handles both IBM 2314 (203-track) single-density drives and (416-track) double-density drives. Selection of single- or double-density drives is made through the manual positioning of a panel switch. This switch eliminates the need for two separate controllers, the firm explained.

The switchable controller is designed for the Sigma 2 through 9 central processors. In another application, a dual-access switch can be used to permit either of two Sigma central processors to operate off-line, on-line or in dual access mode whereby either CPU can gain access to any of up to 16 spindles.

The basic DS-32X free-standing unit in its own cabinet with a two-drive capacity sells for $19,200. For an additional charge it can be field-modified to handle eight drives.

Delivery is 90 days from 17795 Sky Park Circle, 92664.

Correction

The price for 1M byte of Itel 155/PSU and the IBM DAT box [CW, June 6] is $22,500/mo on a five-year lease.

ECG Data Linked to 360/370

PRINCETON, N.J. – Medaq/r from Metromation Inc. is a system that transmits electrocardiogram (ECG) and other clinical data to IBM 360/370 computers for interpretation.

In a typical operation an ECG interface terminal automatically responds to a telephone call from a technician who may be located at any hospital with telephone service to the central processor.

After receiving verification that the line to the central processor has been enabled, the technician transmits patient identification and ECG data. During this operation the system guides the technician, signaling when an acceptable ECG has been received.

Data Digitized

This data is then digitized and passed to the host computer via data or multiplex channels. After the data is processed, results are transmitted to local and/or remote printers.

The first Medaq/4 is being installed at Upsher Laboratories of Kansas City, Metromation said. In this installation the system is tied to a 360/44 to process ECGs for various outlying hospitals. ECGs will be interpreted by a program developed by Dr. R. E. Smith of the Mayo Clinic.

Another software program available to users is the IBM-Bonner electrocardiogram interpretive program which allows the user to perform teleprocessing operations without a separate communications adapter.

Medaq/4 is one of a series of clinical computers available from Metromation. Other Medaqs include stand-alone ECG, clinical laboratory, cardiac catheterization and various monitoring systems.

Cost of the system is $25,000 from 1101 State Road, 08540.

Hardwired Processor Performs Fast Fourier Transforms

NORTHRIDGE, Calif. – The Spectra 900 from Spectra Data Co. is a scientifically oriented hardwired processor designed to perform forward or inverse fast fourier transform (FFT) and coordinate conversion operations on complex data arrays.

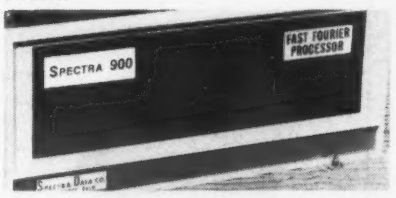
Computations are performed with 20-bit precision, and the most significant (rounded) bits are returned to associated memory along the block floating point exponent, the firm said.

The data path can be 16-, 18-, or 20 bits depending on the user's central processor. The chassis of the Spectra 900 can accomodate eight modules of memory – each 8K words by 18 bits.

Time for operation for the FFT ranges from 4.2 msec for 256 complex points, to 46 msec for 2,048 complex points and 103 msec for 4,096 complex points.

These speeds can be halved by plugging in two 900 modules in one mainframe chassis, the firm added.

Basic price for the FFT processor is $12,750 from 18758-6 Bryant St., 91324.



Spectra 900 Fast Fourier Processor

Disk System Tied to PDP-11, Nova

N. SPRINGFIELD, Vt. – A disk system from Vermont Research Corp. allows PDP-11 and Nova minicomputer users to attach up to four disk drives through one DMA channel.

The series 5000 disk memories feature 666 track/in., 4,200 bit/in., 38 msec average access time, storage capacity of either 37M or 62M bytes, and data transfer rate of 842k byte/sec.

The 8100 controller can be interfaced to the Digital Equipment PDP-11 and Data General Nova. But the unit is microprogrammable and Vermont Research will restructure the unit for other mainframes by special quote.

Cost of the disk subsystem including controller is $17,000 and $15,500 for the 37M and 62M byte models, respectively. The firm is at Precision Park, 05150.

Firm Pays for CE Training

IBM 1620 'Doing Fine Down Under'

By Toni Wiseman
Of the CW Staff

SYDNEY, Australia – The climate "down under" seems conducive to a long and productive life for computers, but apparently in some cases users must pay for the training of their own customer engineers.

Armco Co. reported that its IBM 1620 is still going strong, successfully running a commercial data base system. Current applications include not only a seven-report system of sales, marketing and finance information, but also fabricated inventory, job costing, engineering design and market analysis.

Debtor and creditor processing is presently in the development stage.

Armco is more than pleased with the cost/performance of the 1620, which it purchased for 15% of the original purchase price. The one problem is maintenance because the computer is considered a "vintage" machine. "IBM did not have any persons trained on the 1620 Model II and hence charged us $5,000 to train two of their customer engineers," said Ross Mackay, Armco's DP manager.

"Before purchasing the 1620, we were running engineering design programs on a GE time-sharing terminal at a cost of $3,500 to $4,000 per month. All of these programs were simple to convert to the 1620," Mackay said.

Six Years Young

Armco purchased the computer from St. Andrew's University in Scotland three years ago; the 1620 was then six years old. The company installed it at its Sutherland, Australia, headquarters and began running engineering design programs.

Since then commercial applications have been added to the Fortran machine. These new applications necessitated the addition of a permanent file handling system, which the original scientific configuration did not include. A non-vendor system now handles fixed and variable length records.

The configuration includes 60K of BCD memory, three 1311 disk drives, card punch and reader, and a 600 line/min printer.

Not Overworked

The system is running well and efficiently, according to Mackay, but is in no way overworked. The computer runs 10 hours a day – six of routine work and four of testing.

"I expect to get another four years service from the machine," Mackay concluded, but he added that its useful life will depend largely on IBM's willingness to help maintain it.

However, Mackay expects IBM to give him one year's notice in the event they consider stopping service.

From AUERBACH...
Books that help you Plan and Control Data Processing

1. COMPUTERS: Auditing and Control
New
Elise G. Jancura, CPA, and Arnold H. Berger

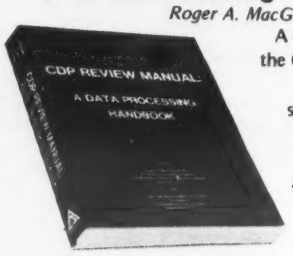
Prevent computer assisted fraud from seeping into your business. This book covers controlling, verifying and evaluating the results of computerized functions with emphasis on methods of effective auditing to improve the credibility of computer produced information. Cost control, application development, equipment utilization, system design, standards, documentation and more are covered to fit the needs of accountants, controllers and DP managers.

P251 / $14.95

2. COMPUTER CONTROL GUIDELINES
Canadian Institute of Chartered Accountants

Here is a practical set of guidelines for preventing costly EDP errors before they occur. It sets minimum standards in seven universally applicable control functions – pre-installation, organizational, development, operations, processing, documentation, and outside data centers. **P195 paper / $10.00**

3. CDP REVIEW MANUAL - A Data Processing Handbook
Roger A. MacGowan and Reid Henderson



A comprehensive review for the CDP exam. 537 Q's & A's encompass all major DP subject areas: equipment, programming and software, DP management, accounting, mathematics, statistics, and systems analysis and design.

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OEM Products

While equipment in this column is primarily for Original Equipment Manufacturers (OEMs), in most cases it is also available in single units to interested users. Further, while some of this equipment is not presently available to the end user, it does give some indication of techniques and products that may be incorporated into end-user equipment.

1,200 Bit/Sec FSK Modem Handles Synchronous Data

FORT WASHINGTON, Pa. – Tele-Dynamics has announced the Model 7202S OEM data set, which operates at 1,200 bit/sec. The medium speed, FSK modem is capable of transmitting and receiving synchronous digital data over the public (DDD) network or private lines.

The 7202S can be operated full-duplex over four-wire lines or half-duplex over two-wire lines. Total synchronization time required is 60 msec from the start of received FSK data, including the carrier detector turn-on delay.

Immediate delivery is available from 525 Virginia Drive, 19034.

Serial Printer Uses One Hammer

SECAUCUS, N.J. – A 15 char./sec, 80-column serial page printer – the Facit 4553 – uses only one print hammer.

The one hammer design means fewer moving parts and thus, a more reliable operation, according to a spokesman for Facit-Addo, Inc.

Printout is made on pressure sensitive paper with characters formed in a 5 by 7 dot matrix. The serial page printer contains drive/control electronics including a character generator contained on two exchangable PCBs.

It is priced at $795 in single quantities with volume discounts available from 501 Windsor Drive, 07094.

Disk Plugs to Most Minis

GOLETA, Calif. – The M200 series of fixed-head disk memories is available in configurations which are plug-to-plug compatible with most minicomputers, according to Applied Magnetics Corp.

Interfaces available include those for the PDP-11, Nova, Super Nova, H316, H516 and others.

The disk subsystem is available with storage capacities to 9M bits.

Cost depends on size and number of disks and the interface ordered from 75 Robin Hill Road, 93017.

Closed-Loop N/C Controls Machines

IRVINE, Calif. – Synergistic Products, Inc. is offering its Model 1800 Computrol N/C unit for machine control.

The SPI Computrol N/C is an integrated circuit, absolute-positioning controller. It has a closed-loop servo system designed to drive and continuously monitor the X and Y motors on almost any two-axis positioning system. Special purpose computer circuits are incorporated in the system to permit performance of 24-bit additions and subtractions.

These circuits also monitor velocity, permitting velocity profiles that result in higher traversing speeds, with optimum start/stop characteristics, the firm said from 1902 McGaw Ave., 93705.

Other OEM Products

The HF Computer Controlled Receiving System – HR-240NS from Lorch Electronics Corp., Englewood, N.J. – covers the 2 to 32 MHz range and can be used in surveillance, communications and radio direction finding.

– – –

A 10-in. thermal strip chart recorder from Esterline Angus, Indianapolis, Inc., is designed for applications involving oscillation of the writing element, slow change input signals and continuous unattended recording.

Firm 'Finds' FBI's Fingerprint Reader Full of Related Uses

By Ken Shonk
Of the CW Staff

BUFFALO, N.Y. – Automatic signature verification applicable to credit cards and checks, rapid processing of aerial photographs, and access control through the use of unmanned personal identification terminals. These are all present development projects of Calspan Corp. using the technology the company developed for Finder, the FBI's prototype fingerprint reader.

"The personal identification terminals which read a fingerprint directly from a finger is the most advanced project," according to Ron Swonger, a development engineer directing Finder-related projects.

"We have a version operating now that has a false acceptance rate on unauthorized applications of less than one in 1,000."

The primary use for the terminals, the company said, would be access control, especially at access gates where it is not economical to have a guard. Losses of cargoes from theft and damage exceed $1 billion annually, Swonger said, pointing out the need for such access control.

The primary problem in the development of the personal identification terminal was designing for low-cost production as well as data transmission over low-cost communications lines, Swonger related.

Calspan developed Finder, which led to new advances in automatic image processing, under a five-year, $1.25 million contract with the FBI and in cooperation with the National Bureau of Standards. The NBS worked on the development of automatic registration, classification and matching algorithms, which comprise the search operations.

How Finder Works

A small general-purpose computer controls Finder's operations, which start with the loading of a standard fingerprint card. A flying spot scanner then scans each print with a 0.001 inch spot of light every 0.002 inch, resulting in 500,000 measurements per print in a half second. Photomultipliers measure the reflected light from each point on a 16-step scale.

Readings are processed through a special-purpose computer that enhances the image by moving a square "window" 25 points on a side across the arrayed data sequentially and changing all the grays to black or white.

A second "window" 16 points on a side analyzes the binary image and identifies ridge endings and bifurcations, locations where the ridges split or end in Y's.

On each print Finder picks out about 80 of the tiny characteristics which differentiate between individual fingerprints, achieving a detection rate of better than 90%.

Calspan developed Finder and the personal identification terminal in its image-processing laboratory using two PDP-9s connected back-to-back with 16K bytes of shared memory. Some of the analysis of the criteria for image-processing development was also done on the company's IBM 370/165.

"Both signature verification and aerial photograph analysis applications of Finder's technology are still in the laboratory experimental stage," Swonger reported.

"The fundamental problem in signature verification is the variability," he said, "due to pen, position and paper as well as substantial changes in style and changing signatures over time."

Swonger noted an acceptable false reject and acceptance rate for a usable system would be about one in 500.

Computers 'Outpsyche' Psychiatrists

CW Hawaii Bureau

HONOLULU – The unreliability of the clinical method for arriving at psychiatric diagnoses has "led to several efforts to utilize computers for integrating clinical observations into psychiatric diagnoses," attendees at the American Psychiatric Association's annual convention were told here recently.

Reporting on the use of computers in assisting psychiatric diagnoses, Dr. Robert L. Spitzer and Dr. Jean Endicott of the New York State Department of Mental Hygiene said out of 100 consecutive patient admissions, 65 of their computerized diagnoses were in agreement with therapists' diagnoses.

In 20 of the cases the computer diagnoses were reported as helpful, while in 15 the computer diagnoses failed.

Failures were attributed to "poor ratings by the therapist, poor algorithms and inconsistencies between what was reported in the clinical records and what was noted on the automated forms and, finally, ambiguities in the official (psychiatric) nomenclature," Spitzer and Endicott said.

The researchers cited several advantages of computer-generated psychiatric diagnoses:

- "First of all, there is the value of necessarily perfect reliability in the sense that given the same data, the computer program will always yield the same diagnosis.
- Secondly, the computer program can utilize rules developed from a large and more diverse sample of actual patients than any single clinician can command.
- "Third, the rules by which a computer assigns a diagnosis are explicit and public.
- "Finally, empirically based rules constitute at least potential advances in our scientific understanding of the complex relationship between symptom characteristics and diagnoses," the researchers said.

The Line Forms Here For the Grocery Club

LOUISVILLE, Ky. – Consumers already have computerized car rentals, dating services and banking accounts, and now housewives here are being offered computerized grocery shopping.

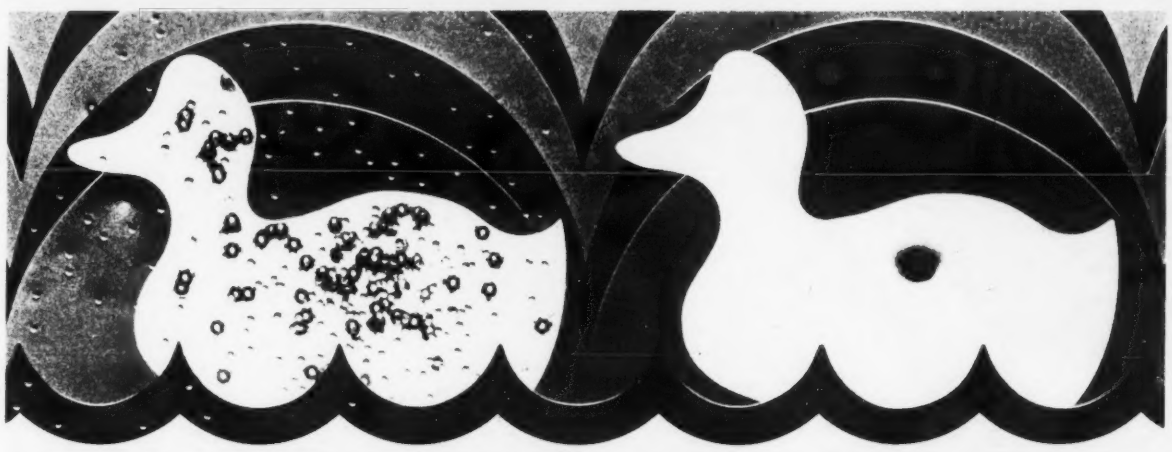
Call-A-Mart is the computerized supermarket brainchild of Mark Weiss, who claims his service can offer same-day delivery of groceries at prices competitive with regular markets.

$5 Catalogue

"Members will phone in their orders selecting groceries from a catalogue which costs them $5. Call-A-Mart operators then punch the order into a computer which tabulates the total cost, adding a $1 service charge for orders less than $20; processes the order through the warehouse; and prepares delivery truck route maps.

"Initial membership will be limited to 3,000," said Weiss, "but within a year we'll be offering service throughout the city and across the river in Indiana."

Converting your DOS programs to OS used to be a shot in the dark.



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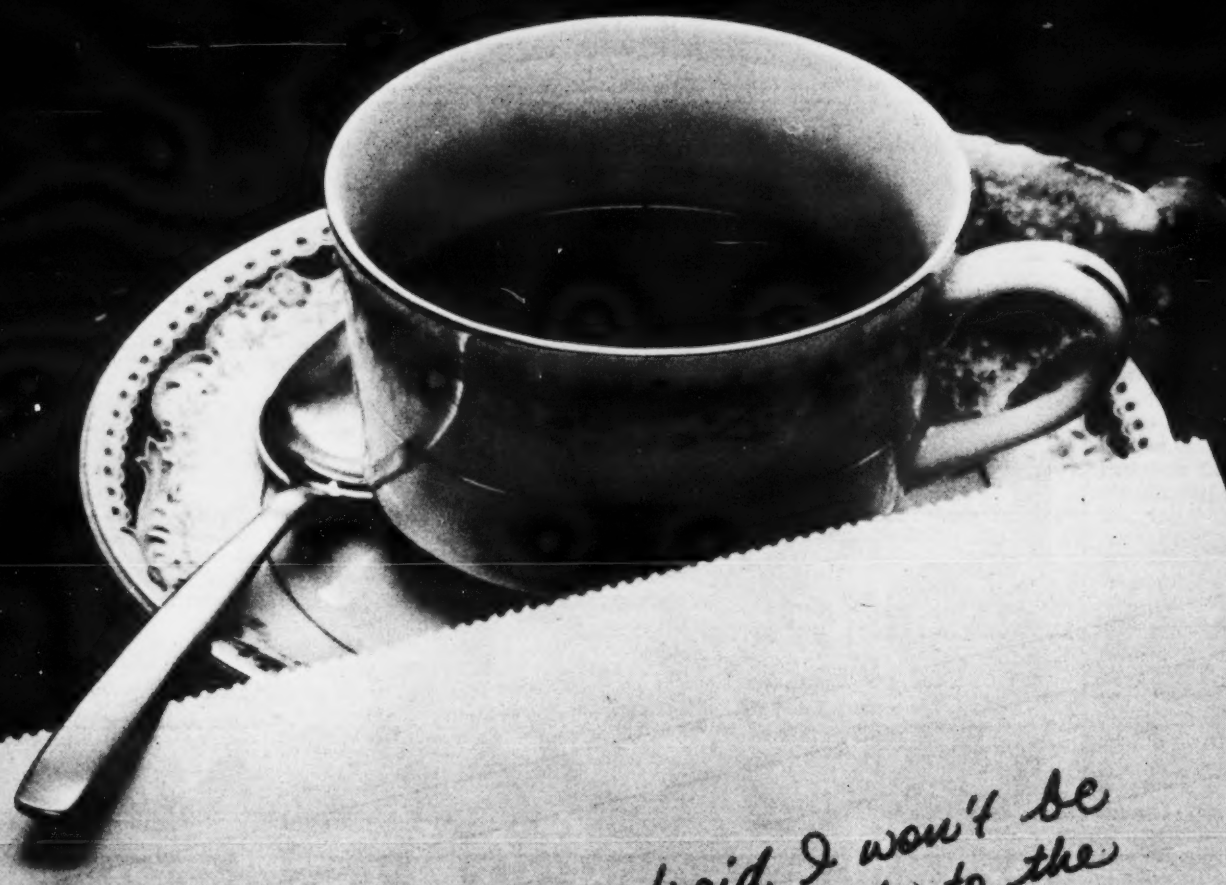
Next time a high-speed drive ruins that bargain tape you bought, here's a note for your wife:



Sweetheart,
Sorry, but I'm afraid I won't be able to take you and the kids to the lake this weekend.
That bargain tape Jack bought got ripped to shreds, and we'll have to spend hours re-running the program.
I told him I'd rather pay the extra for Epoch 4 out of my own pocket, just to have my weekends back.
Try to understand,
Love,
Fred

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Graham, Texas 76046

COMPUTER INDUSTRY

CI Notes

Univac Obtains License To Build Memorex Disks

SANTA CLARA, Calif. – Univac has obtained from Memorex Corp. a non-exclusive license to manufacture Model 651 and 652 flexible disk units for use in Univac products.

A Memorex official said Univac will buy the units on an OEM basis until it begins production.

Memorex is currently manufacturing the 651, and deliveries of the 652 are scheduled for the fourth quarter, after it has been configured to be media-compatible with the IBM 3740 data entry system.

Univac officials declined comment on the firm's plans concerning the disk units.

UCC Effects Realignment

DALLAS – University Computing Co. has realigned its organization into five divisions in order to strengthen the profit and growth potential of its commercial, banking and engineering/scientific computing businesses.

The divisions are: Commercial and Aerospace Group; Scientific and Engineering Division; International and Contract Services; UCC Europe; and Energy Group.

The realignment will allow specialization by product and by industry, eliminating excess equipment, facilities and functions, observed Donald G. Thomson, president.

AMS Cuts Payroll

SUNNYVALE, Calif. – Advanced Memory Systems, Inc. (AMS) has reduced its payroll by 110 overhead and support personnel.

The move is designed to reflect a closer relationship to presently expected levels of business, the firm said. Although new orders continue to be strong, AMS had prepared for a higher level of sales than is now expected, President Robert Lloyd said. Shipments of IBM-compatible systems are expected to be below the maximum levels specified in contracts, he added.

Cogar Corp. has ordered $500,000 of 1K MOS RAMs from AMS over the next year.

Supershorts

Decision, Inc., Oakland, Calif., has received a contract from Cummins-Allison Corp. for its OCR 7600 page scanner. The equipment, valued at over $3 million, will be marketed as part of Cummins' Keyscan data entry system.

– – –

Megadata Computer and Communications Corp. has licensed Leigh Instruments, Ltd., Ottawa, for the manufacture and sale of Megadata CRT terminals in Canada.

– – –

'IBM Goofed,' Study Claims

IBM 4-Year Lease Found Lacking Appeal

By a CW Staff Writer

NEWTON, Mass. – A survey of 370 users has indicated an "underwhelming" response to IBM's four-year term lease plan, indicating "IBM finally goofed in reading the marketplace," according to *EDP Industry Report*, a publication of International Data Corp., a market research firm here.

Although 76% of the respondents indicated they used their systems enough to consider the plan, which eliminates overtime charges, only 6% said they signed up for the plan on their rented virtual storage 370s.

Furthermore, the respondents indicated a key reason for declining what many estimated to be a 13% monthly rental reduction was their desire to keep their flexibility. Sixty-four percent said the lock-in, extension and termination constraints figured heavily in their decision, and 20% answered moderately while 6% said the constraints played a minor role and 10% said they were not a factor, according to the report.

Not only were positive responses to the plan seemingly slim, although the survey was taken only about a month after the plan was announced, but the plan may have backfired, "since its promise of long life for VS/370 seems to be promoting more interest in purchase and third-party lease," the report observed.

In addition, the response indicates that users are becoming more independent and more "confident of their ability to do it themselves; they more clearly see through IBM's moves," according to the report.

"For every user who had ordered a 370 for rental and who now plans to take IBM up on its four-year plan, almost two have opted for an acquisition method – purchase or third-party lease – that defeats IBM's apparent attempt to insure monthly payments for an extended period," the newsletter reported.

Although users frequently change their minds, current orders of VS 370 systems for rental at the time of the four-year term lease (4 ytl) announcement indicate 38 rentals, 15 third-party leases, three purchases and nine four-year terms.

In the survey, the net effect of the 4 ytl announcement is "negative." Twenty-two percent of the 158s and 168s on order "moved away from monthly payments to IBM while 10% that had planned to buy outright from IBM (direct or via third party) have accepted the 4 ytl," the report said.

The plan had the largest impact on 158s and 168s on order, with 158 future users leading in converts to the 4 ytl. About 50% are switching from one acquisition method to another, of which more than a third will go to a third-party lease and an equal number to the 4 ytl.

In the 168s, of the 75% considering switching methods, many are going from purchase to third-party lease, apparently to maintain more flexibility, the newsletter observed.

The plan evidently appeals less to users of small 370s, which may "illustrate the smaller user's need for flexibility and lack of equipment definition two or four years out."

The majority of responses from the 155 and 165 users, for whom the plan is not available, indicated they would consider it if eligible.

The 4 ytl did not seem to appeal to users already engaged in third-party leases. They indicated they converted to third-party lease for economic reasons in the first place, and the reasons still applied.

CIA Fears IBM Self-Division Before Government Suit Settled

By E. Drake Lundell Jr.
Of the CW Staff

LOS ANGELES – Will IBM divide itself and thereby gain respite from the current government antitrust suit against it?

That is currently the worry of the Computer Industry Association, which in turn predicts that such a unilateral move on the part of IBM could be disastrous for the rest of the industry and for the country at large.

Three Outcomes Seen

The association noted it sees three possible outcomes of the government suit against IBM if it is successfully prosecuted by the government – all of which the association feels would be unacceptable to the IBM management:

- IBM might have its marketing and competitive practices severely restricted and regulated by the government. This solution would probably be least odious to IBM since it would not bring about a reduction in IBM's control over the market in the near term, the CIA said.
- IBM would be required to reduce its market share in the industry – an antitrust solution that has been tried before, and which the association said would probably be most odious to IBM management.
- IBM would be restructured into several competing companies, as is suggested in the government suit against the firm. The CIA said that IBM management would probably not like this solution since it would effectively end its market control.

IBM's Move?

Then from the point of view of IBM management, what would be the ideal solution? According to the CIA, it might be a voluntary, unilateral restructuring of the firm into two new companies.

This could be accomplished, the association suggested, by setting up an IBM Data System Corporation and an IBM Business Systems Corporation, with the business systems unit consisting of all personnel, plants and leased equipment associated with the 370/135 and the 360/30 on down, in addition to the System 3 and the present office products division.

The other division would be responsible for all of the other products of the firm in the computer industries. The plants and laboratories of the firm would be split among the two new divisions, according to the plan.

While the idea of IBM splitting itself up voluntarily might seem farfetched, the association said, "We don't think so."

The group noted that the two surviving companies would each have less than 40% of the general-purpose computer market, and on that basis the government would probably drop its charges against the firm, it noted.

The new companies would also remain the dominant factors in the computer business, the CIA added, with each having revenues over $4 billion yearly.

In addition, such a split would protect the companies' stockholders "from the possible loss in value that would be inevitable if the government were to win a judgment and the numerous triple damage suits that would follow," according to the association.

Finally, the two new companies would not have any of the legal constraints on their competitive posture that now bind the overall corporation.

"The two new companies could swallow up that portion of the market held by the five dwarfs and still have only 50% of the market each" – a level that is not considered monopolistic.

The association is presently seeking opinions from users and members of the computer community on the idea and whether other parts of the computer business would agree with its assessment that such a move on the part of IBM would be a disaster for the industry.

Inforex Pact Found in Default

BURLINGTON, Mass. – The General Services Administration has notified Inforex, Inc. that it considers the firm's key-to-disk units in default under its contract to the Social Security Administration.

"Inforex denies that it is in default under the contract, and will vigorously contest the decision," Inforex President T:B. Horgan stated.

The dispute involves performance of the software in a benchmark run recently by the GSA, a spokesman said.

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Vendors Call CRT Terminal Market 'Very Competitive'

By Molly Upton
Of the CW Staff

NEW YORK – While several vendors acknowledge the CRT market is very competitive, few see any likelihood of further reduction of prices, at least in the next year, according to a recent *Computerworld* survey.

"The market is as competitive as possible," noted Jeff Lamm, sales manager of Infoton, Inc. He mentioned he is not concerned about competition from units offered on rental basis, as he said the Infoton Vistar/GT is cheap enough just to buy. The unit is priced at $1,595.

Tektronix, known for its graphic CRTs, has come out with an alphanumeric unit, the 4023, "priced in the exact range" of other units, "which has to say something" about the market, noted Paul Trischitta, Philadelphia district manager.

Duke DeForest, vice-president of marketing for Beehive, said it's the old supply and demand factors. Although Beehive has a mini Bee at the low end of the line for $1,650, he said he doesn't foresee any run on the bottom end of the line.

He noted the user has increasing options from which to choose, and has to be careful he selects a terminal that will meet both his current and future needs in terms of compatibility.

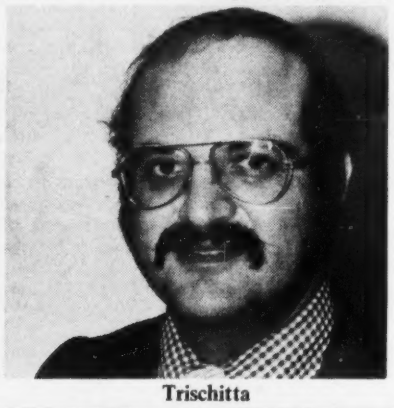
Omron's vice-president of research and development, Russell C. Dubois, said his firm views its CRTs as part of a system, with the unit selected determined by requirements, rather than as a single price item. "Absolutely, it's a competitive market, but everything in DP is," he observed.

The CRT market is expanding, and yes, there is a price war, according to Bill Terry, national sales manager of Lear Siegler, Inc.

Everyone is trying to bring down the price, he noted, but he foresees prices remaining stable for about a year, because of manufacturing and components costs. He added that further price reductions depend largely on conditions in the integrated circuits area.

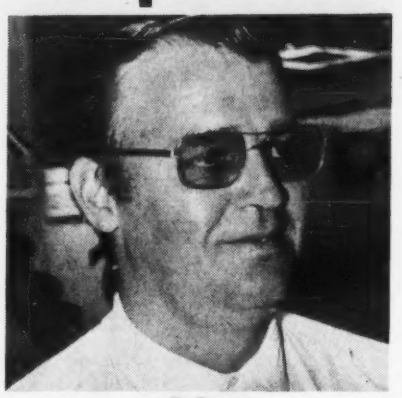
CW Photos by M. Upton

Lamm

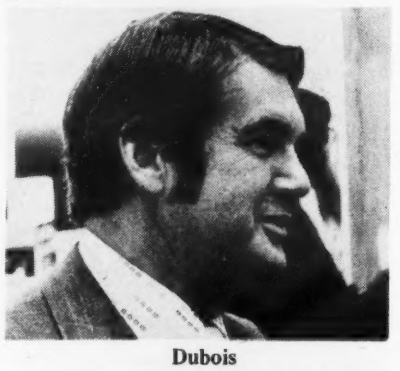


Trischitta

CW Inquiring Photographer



DeForest



Dubois

Terry

Foreign Orders & Installations

Postipankki, the Finnish Postal Bank and PostGiro, has ordered two Trace (transaction control and encoding) document processing systems from AB Recognition Equipment Industri to process up to half a million daily transactions for the users of the postal giro.

Kassenartzlicke Vereinigung, an association of four regional medical insurance societies in West Germany, has ordered four Univac 1106 systems for administrative tasks including a nationwide integrated network to coordinate the clearance of doctors' bills and social insurance claims.

Eastbourne Waterworks Co., Great Britain, has ordered a Century 101 system from NCR. The system will provide engineering data such as water treatment reports, in addition to handling business applications.

E.B. Eddy Co., a Canadian paper producer, has ordered nine Series 1000 Model 75 control systems from Measurex.

Bentalls, a British department store, has installed 45 NCR 280 electronic point-of-sale terminals.

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Packages or In-House?

Myths of Software Vendors Revealed

By a CW Staff Writer

NEW YORK – Software vendors, or firms considering entering the market, tend to believe at least three separate myths, according to Burton Grad, director of development for cross-industry applications at IBM.

At an NCC session on the status and future of software products he warned that too long a delay in seeing the reality in any of these areas could be disastrous.

The myths, he said, are: there is no monolithic body of software that can be packaged; there is no market of users; and there are no easy profits.

Today, programmers in the 50,000 or so U.S. installations are writing something like a million and a half new programs each year and, on top of that, "we're writing lousier code than we've ever written before," Larry Welke, publisher of *ICP Quarterly* said.

This situation, he added, exemplifies the "funny thinking" that accounts for the inefficient use of most DP. The in-house development of so many programs makes sense only "if there are 49,000-odd ways of processing payroll."

Twenty-five years into DP and we find ourselves asking no more of a program than "does it work?" Welke noted. Users shouldn't have to depend on their own skills to get the basic applications into operation, he said.

Instead, the acquisition of software packages, even if they have to be tailored somewhat, can lead the DP management to business-like thinking. Packages have clearly defined functions, clearly stated cost (below in-house development costs) and – perhaps most important – availability within specified time constraints.

They can relieve the in-house programmers of essentially mundane tasks so they can spend more time understanding the system software and optimizing its operation for the installation's needs. That may well be vital, he noted, "when OS becomes no more than a subset of something much worse."

Package user Adrian Basili, chief of application studies for Western Electric, tended to agree with his fellow panelist, but added that his shop tends to use system and support packages, rather than applications. "We know the logic we want in the processing and feel we can write it better in-house," he said.

Earlier in the panel discussion, Phillipe Dreyfus, president of CAP Europe, a software development firm in Paris, spelled out problems in attempting to sell software in Europe, but noted that the market is growing anyway. IBM is the dominant vendor, overall, he admitted, but its position varies drastically from country to country.

Political and legal differences mean there are "zero openings" for any broad-based business-oriented applications packages. Techically-oriented applications, and system and utility packages are saleable, he said.

The way European businessmen operate has an effect on the potential market as well, Dreyfus continued. Phone calls and mail responses are not really acceptable: personal visits are required. Europeans also tend to be more secretive in their operations, which makes it hard to know what their requirements are, but leads to "common law acceptance" of contract terms without concern for patents and trade secrets, he added.

Contracts

Data Dimensions, Inc. has been awarded a contract by United Press International for the development and implementation of a Regional Information Storage and Retrieval System.

Keane Associates, Inc. has received a contract worth over $170,000 from the Industrial Ceramics Division of Norton Co., Worcester, Mass., to design, develop and test an inventory control system.

Atlantic Research Corp. has been awarded a contract by the Baltimore Regional Planning Council to develop an improved Emergency Medical Service communications system to serve six jurisdictions in Maryland.

Continential Can Co.'s Metal Operations has chosen Scientific Time Sharing Corp. to support the company's nationwide accounting operations. Value of the contract is expected to exceed $165,000 annually.

Xynetics, Inc. has begun delivery of a $1.5 million shipment of Model 2000 plotters to Camsco, Inc., Richardson, Texas. The plotters will be incorporated into the Camsco computerized systems used in the apparel and shoe manufacturing industries.

GTE Sylvania Inc. has received a contract for about $3 million from the U.S. Navy to perform a competitive concept validation study for a global communications system.

A facilities management contract involving the installation and operation of an NCR Century 101 computer system for four area commercial banks has been signed in Libertyville, Ill.

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EM&M Seeks to Expand To a Multiproduct Base

By Marvin Smalheiser
CW West Coast Bureau

LOS ANGELES – Electronic Memories & Magnetics Corp. (EM&M) plans to create a multiproduct base that ultimately will lead it into the systems business.

Edward Farris, vice-president and general manager of the Computer Products Division, said: "We now realize that in order to get our cost of selling down, we must bring to the market more than just memories."

He said EM&M is looking to expand the product base through internal development, OEM agreements and acquisitions.

Mainframes Unlikely

A front-end processor as well as other peripherals are possibilities, he said, but there is no burning desire to get into the mainframe business.

EM&M, he said, is three to five months away from introducing a peripheral outside the current memory line.

Core has been EM&M's bread and butter and Farris said he believes it will be an important part of the memory market for a long time to come, semiconductors notwithstanding.

"I expect to see a dramatic increase in the growth of core bits used in the next five years," Farris said, citing the trend to larger and larger memories.

Semiconductors now "are not able to obtain the cost/performance in any volume to take a mainframe position. If a guy needs two to three million bits of memory, core is still the lowest cost way and highest performance way," he said.

Farris, however, said core and semiconductors are complementary and will grow together.

"Ultimately we have to be in the semiconductor business and there is no doubt in my mind that semiconductors will take the position in the hierarchy of memory that core now enjoys."

Semis Attractive

EM&M, he said, is making substantial efforts to develop semiconductor capability and is shipping bipolar devices.

An N-MOS memory will be available in the third quarter and in production in the fourth quarter, Farris said.

It will be used for a memory for the 370 Model 145, if it is ready in time; otherwise bipolar will be used and N-MOS integrated later, he said.

Farris said the overriding problem in the market now is an extremely severe price erosion in core add-on and replacement memory, but noted "there is a general firming up of prices."

One of the reasons for the price erosion, he said, was that "very few of us recognized the cost of supporting this product.

"We all came out of the OEM business and didn't know what was required to support the end-user product. We didn't do a good job of estimating the cost of support."

Farris said EM&M's Memory Products Group will have a "banner year" in 1973.

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DP Exports Spur Rise in UK Industry

LONDON – A rise in exports of computer products spurred an overall increase in the industry in the UK, according to a report published by the Department of Trade and Industry here.

Export deliveries reached a total value in 1972 of $276.3 million of total deliveries of $762.3 million during the year and the proportion is expected to continue to increase, the report indicated.

As an example of the growing significance of exports to the overall industry picture, the report cited the improvement in exports over 1970, before the industry experienced its slump.

Home deliveries in 1972 reached $490.9 million, a 5% improvement over the 1971 figure, but still less than the 1970 level of almost $508 million.

Exports, however, were not only 12% greater than in 1971 but topped the 1970 figure of $247.1 million.

The portion of export deliveries grew 7% from 1971, and at the end of the year export orders accounted for almost 45% of total orders on hand, 2% greater than three months earlier and 18% above the previous year, the report showed.

The fourth quarter was a record for the industry, with total computer output of $244.8 million, an improvement of 5% over the third quarter of 1972 and 19% higher than a year ago.

The year as a whole also set records for computer output, with a total of $849.2 million, a 5% increase over 1970 and 8.5% rise over 1971.

Eldorado Shifts Lineup

CW West Coast Bureau

CONCORD, Calif. – Gene N. Landrum, president of Eldorado Computer Corp., has assumed additional duties as a corporate vice-president at the parent company, Eldorado Electrodata.

Dennis Mandell, formerly western regional sales manager of Eldorado Computer Corp., has been promoted to director of marketing for the computer company.

Landrum said his new duties would not lessen the emphasis on the computer effort, which he said is "going full steam."

Expansions

Singer Business Machines has started construction of a 12,000-sq-ft sales and service center just west of Stemmons Freeway in North Dallas.

Hewlett-Packard Co. is erecting a 260,000-sq-ft, two-story building on the company's 97-acre manufacturing facilities site in Colorado Springs, Colo.

Four-Phase Systems, Inc. will lease a newly constructed 135,000-sq-ft facility in Cupertino, Calif., for office and manufacturing space to produce the firm's Intelligent Terminal Systems.

Iomec, Inc. is constructing a 60,000-sq-ft building in Santa Clara, Calif., for consolidation of all disk drive manufacturing operations for its DataStor Division.

Capital Computer, Inc., a service corporation, has doubled its office and production capabilities by moving to new headquarters at 1800 Silas Deane Hwy., Rocky Hill, Conn.

MSI Data Corp. has built a 47,000-sq-ft manufacturing facility adjacent to the company's headquarters at 340 Fischer Ave. in Costa Mesa, Calif.

Modular Computer Systems, Inc. has rented a 20,000-sq-ft building next to the company's headquarters in Fort Lauderdale, Fla., to serve primarily as the firm's national training center.

Hewlett-Packard will begin construction this summer of two general-purpose buildings of 135,000-sq-ft each on the company's 55-acre industrial site in Santa Clara, Calif.

GTE Data Service, Inc. will build an 18,000-sq-ft building in Muskegon, Mich., to consolidate its two computer operations in Muskegon and Owosso, Mich.

The San Francisco Division of Systems, Science and Software has moved to a new 70,000-sq-ft facility in Hayward, Calif., to better accommodate the recently created bay area division.

Decision Data Computer Corp. has begun construction on a 48,000-sq-ft addition to its headquarters and manufacturing facility in Horsham, Pa.

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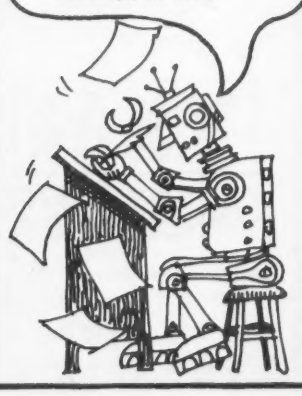

Acquisitions

Allen-Babcock Computing, Inc. of Los Angeles has acquired **Arco Data Processing Services** of Portland, Ore., a wholly owned subsidiary of Amerco, Inc.

Computer Machinery Corp. has agreed in principle to acquire **Cipher Data Products, Inc.** through an undisclosed rate of exchange of common stock. Cipher supplies magnetic tape drives and cassette transports.

A group consisting primarily of British companies has acquired **Advanced Systems Inc.** for 520,000 shares of common stock at $5 a share. The principal firm acquiring Advanced Systems shares is **Education Sciences Ltd.**, Advanced Systems' licensee for Britain and Western Europe.

Boeing Computer Services, Inc. has acquired a significant equity interest of **The Leader Corp.**, a New Mexico-based financial data processing firm, with an agreement to obtain 100% ownership within a three-year period.

Datamation Services of New York City has acquired the **New York DP operations** of Infonational, Inc. of San Diego, Calif. for an undisclosed amount of cash and commissions.

Varisystems Corp. of Plainview, N.Y., has acquired the **data terminal product line** of Maxson Electronics Corp. for an undisclosed amount of cash and future royalties.

Computer Horizons Corp. has agreed in principle to purchase **Republic Systems and Programming, Inc.** of East Orange, N.J.

Control Data Corp. has acquired **Systems Resources Inc.** of Dallas, which it will maintain as a subsidiary.

Computer Congenerics Corp. has acquired **Compute America Corp.** for an undisclosed price.

General Automation Nets Record

ANAHEIM, Calif. – A strong third quarter has helped General Automation, Inc. achieve record earnings and revenues for the nine-month period ended April 30.

The firm has exceeded the sales and earnings for the full 12 months of fiscal 1972, noted President Lawrence A. Goshorn.

Quarter Earnings Up

In the quarter, earnings rose to $564,000 or 23 cents a share compared with $301,000, including a $140,000 special credit, or 15 cents a share in the comparable year-ago period.

Revenues for the period rose to $7.8 million compared with $4.1 million a year ago.

Nine-month earnings totaled $2 million or 91 cents a share, including a $586,000 special credit. This compares with $912,000 or 50 cents a share in the year-ago period, when a $442,000 special credit was included.

Revenues reached $19.8 million in the period, up from $10.6 million a year ago.

The firm has expanded its sales organization to "better align management responsibilities with the markets and industries targeted in our long-range objectives," Goshorn added.

Datapoint Earnings Head Upward

SAN ANTONIO, Texas – For the third successive quarter, Datapoint Corp. has reported record earnings.

In the three months ended April 30, the firm, formerly Computer Terminal Corp., earned $592,000 or 32 cents a share compared with a loss of $561,000 or 43 cents a share in the same period last year.

Revenues reached $5.3 million, up from $1.4 million a year ago.

Shipments on an "as sold" basis rose to $8.8 million compared with $2.6 million in the comparable year-ago period.

Nine Months

For the nine months, the picture was also bright, with earnings totaling $1.1 million or 64 cents a share compared with a loss of $1.8 million or $1.36 a share in the year-ago period.

Revenues also rose, to $12.2 million from $3.3 million.

Datapoint has secured a $6 million revolving line of credit from the First National Bank of Chicago and Frost National Bank of San Antonio. This represents a $2 million increase.

Under an amended lease financing arrangement, North American Corp. has agreed to purchase $5 million of equipment on lease by Datapoint, if available, during each of the two years beginning May 1, 1973.

Data Products Triples Earnings for Year

WOODLAND HILLS, Calif. – Tripled earnings and record revenues were the news from peripherals-maker Data Products Corp.

In the year ended March 31, earnings tripled to $2.3 million or 34 cents a share from $703,000 or 10 cents a share a year earlier.

Revenues rose 18% to $59.8 million from $50.9 million a year ago, and backlog at year-end totaled $34.1 million, up from $23.4 million.

During the year, the firm reduced its debt by over $9 million, doubled its working capital, and increased its tangible net worth to $5 million, a spokesman said.

Hazeltine Signs Lease Financing Agreement For Display Terminals

GREENLAWN, N.Y. – Hazeltine Corp. has agreed to sell up to $13.5 million of equipment under short-term rental agreements to Hazeltine Leasing Co., a limited partnership formed by U.S. Leasing International, Inc. and the St. Paul Leasing Co.

The agreement can be extended to cover the purchase of up to $17.5 million of additional equipment in the following year, and includes such units as the Hazeltine 1000 and 2000 display terminals.

Hazeltine also granted to U.S. Leasing International, Inc. and The St. Paul Companies, Inc., the parent company of St. Paul Leasing, the rights to purchase up to 25,000 shares each of Hazeltine Corp. common, at $10 per share over five years. The rights on half the shares are subject to Hazeltine Leasing extending the agreement for the second year.

TLW'S
Seventh Annual
GIANT
Computer Sale

THE GREATEST SALE OF 60's THE 70's WILL EVER SEE!

360/50-I
Serial #54630
1052 - 512K
6980, 6981,
7920, Mod 7
keyboard
Avail: July

360/40-GF
Serial #52158
1052 - 196K
3237, 3274,
4427, 4457,
6980, 6981,
7520,
Avail: June

360/40-H
Serial #22229
2040 - 256K
3237, 3274,
3621, 4427,
6980, 6981,
7520, 7920,
Mod 8 keyboard
Avail: July

360/40
Serial #21694
1052 - 64K
6980, 6981,
3237, 4427,
4457, 7520,
7920
Avail: July

360/30-E
Serial #10573
2030 - 32K
3237, 4456,
4463, 4466,
4760, 6960,
6961, 7520,
7915
1051/1052
Avail: June

360/30-F
Serial #16109
2030 - 64K
3237, 4456,
4463, 4465,
4466, 4468,
6960, 7520,
7915
1051/1052
Avail: July

370/155-J
Serial # 10488
1433, 3700,
3950, 5450,
7855, 3215
Mod I console
Avail: Dec.

I/O Sets Available with the above:
2821-I, 2821-II,
1403-II, 1403-III,
1403 NI, 2540

2314-I
9 spindle
Avail: Aug.

2314-AI
5 spindle
Avail: Sept.

2314-AI
9 spindle
Avail: June

Other Machines Available Now:
1401 - 1440 - 1620 Systems
Tape Drives - II, III, V
Tape Converters

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TLW
COMPUTER
INDUSTRIES

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Atlanta, Georgia 30341
404/451-1895

222 E. Wisconsin Avenue
Lake Forest, Illinois 60045
312/295-2030

3031 Tisch Way, Executive Suite 13
San Jose, California 95128
408/249-0110

TRADE*QUOTES

Computerworld Stock Trading Summary

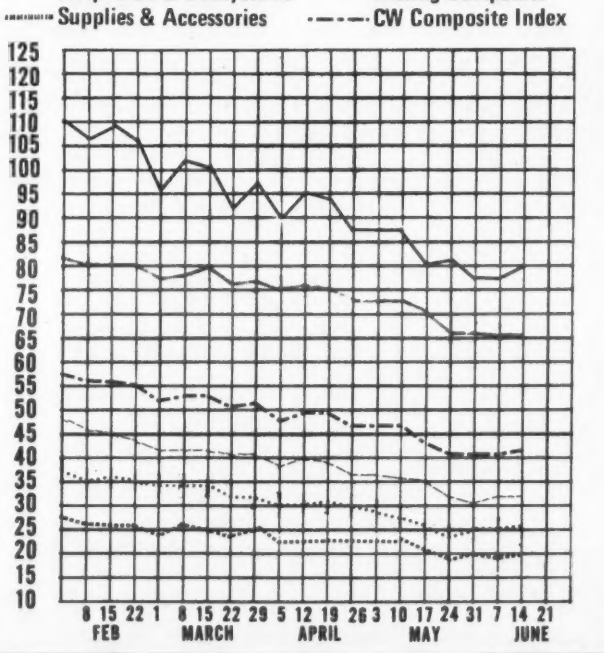
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, JUNE 14, 1973

EXCH		1973 RANGE (1)	CLOSE JUN 14 1973	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1	0	0.0
A	APPLIED DATA RES.	2- 4	2	0	0.0
O	APPLIED LOGIC	1- 3	1 1/2	0	0.0
N	AUTOMATIC DATA PROC	52- 94	55 1/4	-2 1/2	-4.3
O	BRANDON APPLIED SYST	1- 1	1/2	- 1/8	-20.0
O	COMPUTER DIMENSIONS	2- 5	3 1/2	+ 1/4	+7.6
O	COMPUTER DYNAMICS	1- 2	5/8	0	0.0
O	COMPUTER NETWORK	1- 5	1 1/2	0	0.0
N	COMPUTER SCIENCES	2- 6	2 3/4	0	0.0
O	COMPUTER TASK GROUP	1- 2	1 1/2	- 1/4	-14.2
O	COMPUTER TECHNOLOGY	1- 3	1	0	0.0
O	COMPUTER USAGE	4- 9	5	- 1/8	-2.4
O	COMRESS	1- 2	1/4	0	0.0
O	COMSHARE	4- 9	4 1/2	- 1/4	-5.2
N	CONDURA CORP	6- 15	5 5/8	- 1/8	-2.1
O	DATATAB	2- 4	2	+ 1/4	+14.2
O	EDP RESOURCES	1- 3	1	0	0.0
A	ELECT COMP PROG	1- 2	1 1/8	- 3/8	-25.0
N	ELECTRONIC DATA SYS.	33- 56	32 3/4	-3 1/8	-8.7
O	INFORMATICS	2- 6	3 3/4	+ 7/8	+30.4
O	I.O.A. DATA CORP	1- 1	5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	3	0	0.0
O	KEYDATA CORP	7- 12	6 1/2	0	0.0
O	LOGICON	4- 7	3 5/8	- 1/4	-6.4
A	MANAGEMENT DATA	2- 5	2	+ 1/4	+14.2
O	NATIONAL CSS INC	8- 41	20 3/4	+3	+16.9
O	NATIONAL INFO SRVCS	1- 2	1	0	0.0
P	ON LINE SYSTEMS INC	13- 17	12 7/8	+ 1/8	+0.9
N	PLANNING RESEARCH	3- 7	2 5/8	- 1/8	-4.5
O	PROGRAMMING METHODS	21- 24	21	-1 1/4	-5.6
O	PROGRAMMING & SYS	1- 1	3/4	- 1/8	-14.2
O	RAPIDATA INC	6- 24	6 1/4	- 1/4	-3.8
O	SCIENTIFIC COMPUTERS	1- 2	1	0	0.0
O	SIMPLICITY COMPUTER	2- 4	2 7/8	- 1/8	-4.1
O	THS COMPUTER CENTERS	3- 4	2 1/2	- 1/4	-9.0
O	TCC INC	1- 1	1/2	+ 1/8	+33.3
O	TYMSHARE INC	6- 12	7 1/8	+ 1/2	+7.5
O	UNITED DATA CENTER	5- 6	4	0	0.0
N	UNIVERSITY COMPUTING	5- 11	5 3/8	- 5/8	-10.4
A	URS SYSTEMS	4- 8	4 1/4	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	12- 34	13	+ 7/8	+7.2
O	ADVANCED MEMORY SYS	5- 23	6	- 1/4	-4.0
N	AMPEX CORP	4- 7	4 3/4	- 3/8	-7.3
O	ANDERSON JACOBSON	3- 6	3 1/4	- 1/4	-7.1
O	BEEHIVE MEDICAL ELEC	6- 10	7	+ 1/4	+3.7
A	BOLT,BERANEK & NEW	6- 12	6 1/2	+ 1/2	+8.3
N	BUNKER-RAMO	6- 18	10 1/8	+ 3/8	+3.8
A	CALCOMP	5- 13	7 1/4	- 1/8	-1.6
O	CAMBRIDGE MEMORIES	10- 15	9 1/4	- 1/4	-2.6
O	CENTRONICS DATA COMP	13- 28	18	+1 3/4	+10.7
O	CODEX CORP	9- 19	11	+1	+10.0
O	COGNITRONICS	1- 3	1 5/8	+ 1/8	+8.3
O	COMPUTER COMMUN.	1- 4	1 1/2	+ 3/8	+33.3
A	COMPUTER EQUIPMENT	2- 3	2 1/4	0	0.0
O	COMPUTER MACHINERY	6- 13	6 1/2	0	0.0
O	COMPUTER TRANSCEIVER	2- 6	1 7/8	+ 1/8	+7.1
N	CONRAC CORP	15- 32	16	+ 1/4	+1.5
A	DATA PRODUCTS COMP	2- 4	2 7/8	- 1/8	-4.1
O	DATA RECOGNITION	2- 3	1 1/2	0	0.0
O	DATA TECHNOLOGY	2- 5	2 5/8	0	0.0
O	DI/AN CONTROLS	2- 4	2 1/8	0	0.0
N	ELECTRONIC M & M	3- 6	3 3/8	+ 3/8	+12.5
O	FABRI-TEK	3- 5	2 5/8	- 1/8	-4.5
O	GENERAL COMPUTER SYS	6- 9	6	0	0.0
N	GENERAL ELECTRIC	56- 76	58 7/8	-1 7/8	-3.0
N	HAZELTINE CORP	5- 9	6	+ 3/4	+14.2
O	INFOREX INC	8- 23	7 5/8	-1 5/8	-17.5
O	INFORMATION DISPLAYS	1- 2	3/4	+ 1/8	+20.0
O	INFORMATION INTL INC	10- 15	9 3/4	- 1/4	-2.5
A	LUNDY ELECTRONICS	4- 9	4 1/4	+ 1/8	+3.0
O	MANAGEMENT ASSIST	1- 1	1/4	0	0.0
A	MILGO ELECTRONICS	15- 28	15	- 1/2	-3.2
N	MOHAWK DATA SCI	4- 13	5	+ 1/8	+2.5
O	ODEC COMPUTER SYST.	2- 6	2 1/4	0	0.0
O	OPTICAL SCANNING	2- 7	3	0	0.0
O	PERTEC CORP	5- 8	5 3/8	- 1/8	-2.2
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	4- 9	4	+ 3/8	+10.3
O	PRECISION INST.	2- 6	3	+ 1/2	+20.0
O	RECOGNITION EQUIP	4- 8	4 3/8	- 1/8	-2.7
N	SANDERS ASSOCIATES	7- 18	8	+ 3/8	+4.9
O	SCAN DATA	2- 6	1 1/2	- 1/8	-7.6
O	STORAGE TECHNOLOGY	12- 34	13 1/4	- 3/4	-5.3
O	SYCOR INC	9- 14	11 1/4	- 1/4	-2.1
O	TALLY CORP.	2- 14	3 3/4	0	0.0
N	TEKTRONIX INC	30- 53	33 1/2	+2 1/2	+8.0
N	TELEX	3- 6	4	+1	+33.3
O	WILTEK INC	10- 18	10 1/2	0	0.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	5- 9	6 1/4	0	0.0
A	BARRY WRIGHT	6- 13	7 3/8	+ 1/4	+3.5
A	DATA DOCUMENTS	17- 22	17	- 1/8	-0.7
O	DUPLEX PRODUCTS INC	7- 10	8 1/4	+ 1/2	+6.4
N	ENNIS BUS. FORMS	5- 8	5 1/8	- 3/8	-6.8
O	GRAHAM MAGNETICS	10- 20	10 1/4	0	0.0
O	GRAPHIC CONTROLS	9- 12	8 7/8	0	0.0
N	3M COMPANY	78- 89	83 3/4	- 3/8	-0.4
O	MOORE CORP LTD	53- 60	55	+ 1/2	+0.9
N	NASHUA CORP	42- 58	47 1/4	+1	+2.1
O	REYNOLDS & REYNOLD	40- 51	41 1/8	0	0.0
O	STANDARD REGISTER	14- 20	14 3/4	0	0.0
O	TAB PRODUCTS CO	10- 23	10 1/2	0	0.0
N	UARCO	17- 23	18 3/8	+ 3/4	+4.2
A	WABASH MAGNETICS	5- 7	5 1/8	0	0.0
N	WALLACE BUS FORMS	17- 26	17 1/8	- 7/8	-4.8
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	211-245	228	+3 7/8	+1.7
N	COLLINS RADIO	17- 26	17 1/8	- 7/8	-4.8
N	CONTROL DATA CORP	35- 62	35 1/4	-1 3/8	-3.7
O	DATA GENERAL CORP	28- 46	32 1/4	+1	+3.1
O	DIGITAL COMP CONTROL	2- 6	2 1/8	- 1/8	-5.5
N	DIGITAL EQUIPMENT	73-105	81 3/4	-2 1/8	-2.5
N	ELECTRONIC ASSOC.	4- 9	4 1/2	- 1/8	-2.7
A	ELECTRONIC ENGINEER.	6- 11	8	+ 7/8	+12.2
N	FOXBORO	23- 32	28 5/8	+1 1/2	+5.5
O	GENERAL AUTOMATION	26- 55	27	-1 1/2	-5.2
O	GRI COMPUTER CORP	1- 3	1	0	0.0
N	HEWLETT-PACKARD CO	74- 95	76	-6 1/8	-7.4
N	HONEYWELL INC	99-139	103 3/8	+1 5/8	+1.5
N	IBM	307-340	321	-1	-0.3
O	INTERDATA INC	7- 13	9	+ 1/4	+2.8
N	MEMOREX	2- 19	4 7/8	+ 3/4	+18.1
O	MICRODATA CORP	3- 10	2 7/8	+ 1/8	+4.5
N	NCR	27- 37	35 3/8	+ 7/8	+2.5
N	RAYTHEON CO	25- 34	25 3/8	- 3/8	-1.4
N	SPERRY RAND	36- 50	39 1/2	+ 1/4	+0.6
A	SYSTEMS ENG. LABS	3- 8	3 3/4	+ 7/8	+30.4
N	VARIAN ASSOCIATES	10- 20	11 1/2	- 1/2	-4.1
N	WANG LABS.	13- 34	15 1/2	+1 1/4	+8.7
N	XEROX CORP	141-169	155 5/8	+2 5/8	+1.7
	LEASING COMPANIES				
A	BOOTHE COMPUTER	1- 5	1 1/4	0	0.0
O	BRESNAHAN COMP.	1- 2	2 1/8	0	0.0
O	COMDISCO INC	6- 17	6 1/2	+ 3/8	+6.1
O	COMMERCE GROUP CORP	3- 4	3 3/8	- 1/8	-3.5
O	COMPUTER EXCHANGE	1- 1	1/2	- 1/8	-20.0
A	COMPUTER INVSTRS GRP	2- 8	3	+ 3/8	+14.2
O	COMP. INSTALLATIONS	1- 2	1	- 1/8	-11.1
N	DPF INC	5- 9	6 3/8	+ 1/2	+8.5
M	DATRONIC RENTAL	2- 3	2 1/8	0	0.0
A	DCL INC	2- 3	1 1/2	0	0.0
A	DEARBORN-STORM	14- 26	14 1/4	- 1/4	-1.7
A	DPA, INC.	5- 8	5	0	0.0
A	GRANITE MGT	2- 6	3 1/2	+ 3/4	+27.2
A	GREYHOUND COMPUTER	3- 6	3 3/4	- 1/8	-3.2
A	ITEL	4- 12	5 1/2	+ 1/2	+10.0
N	LEASCO CORP	9- 18	9 3/8	+ 1/4	+2.7
O	LEASPAC CORP	2- 8	2 1/8	+ 1/4	+13.3
O	LECTRO MGT INC	1- 2	1 1/4	0	0.0
O	NRG INC	6- 15	7 1/2	+1 1/4	+20.0
A	ROCKWOOD COMPUTER	1- 3	1 1/4	+ 1/8	+11.1
N	U.S. LEASING	16- 36	19	+2 5/8	+16.0

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

COMPUTER STOCKS TRADING INDEX



Earnings Reports

BEEHIVE MEDICAL ELECTRONICS
Six Months Ended March 31

	1973	1972
Shr Ernd	$.22	$.03
Revenue	1,512,389	789,550
Earnings	204,314	24,302

VARIAN ASSOCIATES
Three Months Ended March 31

	1973	1972
Shr Ernd	$.23	$.06
Revenue	60,774,000	51,459,000
Earnings	1,621,000	423,000
6 Mo Shr	.43	.13
Revenue	115,572,000	97,871,000
Spec Cred	.....	a258,000
Earnings	3,073,000	925,000

a—Gain on sale of land less writeoffs.

DATRONIC RENTAL
Three Months Ended March 31

	1973	1972
Shr Ernd	$.16	$.04
Revenue	1,181,167	857,736
Earnings	108,387	24,840
9 Mo Shr	.43	.20
Revenue	3,012,225	2,458,016
Earnings	292,516	134,722

FOXBORO
Three Months Ended March 31

	1973	1972
Shr Ernd	$.16	$.26
Revenue	35,111,000	38,816,000
Earnings	732,000	1,194,000

BARRY WRIGHT
Three Months Ended March 31

	1973	1972
Shr Ernd	$.23	$.19
Revenue	9,260,018	7,529,416
Spec Cred	.....	a92,947
Earnings	382,085	312,882

a—Gain on sale of land and buildings.

DOCUTEL
Three Months Ended March 31

	1973	1972
Shr Ernd	$.85	$.16
Revenue	8,836,000	4,318,000
Tax Cred	1,049,000	176,000
Earnings	2,126,000	353,000

SCAN-DATA
Three Months Ended March 31

	1973	1972
Revenue	$1,613,506	$1,238,581
Earnings	1,849	a(315,196)

a-Restated to reflect changes in accounting procedures.

AUTEX
Six Months Ended March 31

	1973	1972
Shr Ernd	$.17	$.25
Revenue	2,709,434	2,039,543
Spec Item	a38,778	b38,250
Earnings	113,777	120,116

a-Charge; from termination of proposed construction less tax credit. b-Credit; from tax-loss carryforward.

BOOTHE COMPUTER
Three Months Ended March 31

	1973	1972
Shr Ernd	.....	$.23
Revenue	$11,261,000	15,332,000
Spec Cred	.....	a298,000
Earnings	(1,086,000)	481,000

a-Gain from sale of stock of a 50%-owned company.

LEASCO
Three Months Ended March 31

	1973	1972
Shr Ernd	$.72	$.53
Revenue	170,810,000	152,789,000
Earnings	11,666,000	8,604,000

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- Transportation and Installation Arranged
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You can specify from one to 16 drives under one controller.

Each drive has a waist-high slide-back cover, for quick and easy 3336 disk change. All internal components are easily accessible. And average access time is just 27 milliseconds.

The controller's features are equally outstanding. It has a standard 8-drive addressing capability, with 16-drive optional. The 360 mode switch allows you to use it on a 360-65 as well as a 370 or in combination. And you can add on ITEL's Fixed-Head File for super-fast access and transfer times.

So we suggest you take the offensive against the high cost of data processing. Call the Data Products Group at ITEL—the financial alternative to IBM.

ITEL CORPORATION One Embarcadero Center, San Francisco, Calif. 94111
(415) 989-4220

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Company _____ Phone _____

Address _____

City _____ State _____ Zip _____